

COMPUTERWORLD

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Appeal Warns of 'Thought Control'

WASHINGTON, D.C. — The patenting of computer programs could lead to thought-control à la George Orwell, according to the Patent Office's brief asking for a rehearing of the Prater & Wei case. This is the case in which the Court of Patent Appeals ruled that computer programs could be patented on the grounds that acts which could be performed mentally and also performed without human intervention were patentable.

In its request the Patent Office
(Continued on Page 20)

Precompiler Can Save Users Both Computer Time, Money

WASHINGTON, D.C. — Everyone will now be able to determine the degree to which a given Cobol compiler meets the new government Cobol standards, according to Dr. Grace Hopper of the Navy Project Languages Group.

New Precompiler

A precompiler, written in Cobol, is now available at no cost which will examine both programs and compilers for exceptions to the standard. The precompiler is being released in conjunction with the

newest version of the Navy standards test programs for compilers.

The precompiler includes a Flowbol translator, which allows the user to code his Cobol programs in a shorthand notation, and have the translator generate proper source language for the Cobol compiler.

The precompiler provides excellent documentation for managers, describing the function and flow of the program and noting exceptions to standard coding.

Diagnostics

The program produces diagnostics indicating various types of syntax errors, general logical errors, incorrect usage, and undefined functions. It produces a line for line listing showing the translated source language and the error indicators.

The diagnostic capability provides an opportunity to reduce the number of compilations necessary to complete the program, thereby reducing the amount of computer time needed.

The net effect of such precompilers could be to improve the overall working efficiency of the programming industry, without sacrificing needed machine and man time. Precompilers have been used successfully in several installations across the country.

New Test Programs

The newest version of the standard test

programs incorporates the ability to test a compiler itself, determine whether it can accept correct source language and whether it will reject incorrect or ambiguous source language.

The programs also test the effectiveness of the generated code, and determine the areas where errors are detected.

The programs are available by sending a standard computer tape to: George M. Baird, Manager of Testing and Evaluation, Navy Project Languages Group, Pentagon, Room 5D-840, Washington, D.C. 20350. Please specify which programs are desired.

CW Takes a Holiday

One of our sharper (or possibly lazier) staff members noticed that there are 53 Wednesdays in 1969.

Since we only promised you 52 papers, and since the first Wednesday, Jan. 1, falls on a holiday, and since we would like to go home for the holidays, we are combining the Jan. 1 and Jan. 8 issues — and taking a few days off.

Happy New Year!

Fast Terminal Handles Up to 4 I/Os at Once

SANTA ANA, Calif. — A high speed remote terminal system has been announced by Data Computer Systems. The unit, "the first fourth generation remote communication terminal," provides full remote capabilities including keyboards, card readers, printers, and punches over voice grade lines.

The unit is compatible with all current major computers, using any of three transmission modes, ASCII, ASCII-8, and EBCDIC at the user's choice. The system uses an MOS memory system, with hardware conversion from format to format with very low failure rate, according to a company spokesman.

The system can read a card, transmit a message, receive a message, and print on the printer simultaneously on a four-wire full duplex line, providing extensive overlap operations.

Data Compression

The system also offers hardware data compression and unpacking without the need for operator intervention, providing drastic reductions in telephone connect time, the company said.

The system, called the CP-4, can be interfaced to any standard modem, providing operating speeds up to 240,000 bits per second.

The unit can operate with line printers at 315 lpm or with the new Inktronic printer at 120 cps. It can handle optical mark sense equipment at 100 cards/minute, Teletypes, paper tape, magnetic tapes, disks, CRT displays, card readers at 300 cards/minute and any standard modem, and is suitable for either batched or time shared operation.

The basic system is available for prices ranging from \$29,000 to \$42,500. Lease prices run from \$785/month to \$1100/month.



Typical remote site data processing center for the Apollo 8 mission.

Computers Form Apollo Communications Lifeline

HOUSTON — Live TV from space may have been more spectacular, but the real communications from Apollo 8 were handled by computer.

The communications network consisted of ground, sea, and airborne tracking stations, a central processor at the Goddard Space Flight Center in Greenbelt, Md., and command and communications systems located at Mission Control in Houston.

The 14 ground tracking sites and four Apollo instrumentation ships each has a remote site data processing system, using Univac 1230 computers. The remote site data processing systems accept, record, and transmit data originating from the spacecraft, and compute and issue commands to the spacecraft.

Each tracking station is called a remote site because it is

controlled by Mission Control in Houston. Commands are prestored in the remote site program or are received in real-time from Mission Control.

Sensors in the spacecraft continuously sample the pressure and temperature inside the capsule, its attitude and position in space, and physical factors such as the astronauts' respiration, heart beat, and temperature. The computers can handle up to 200 measurements. The telemetry data is documented by the computer itself, rather than by a special purpose processor that was used during the Gemini program.

Messages from the remote sites are sent to Goddard, where they are formatted, checked for validity, automatically assigned a priority, and routed to Houston. Goddard uses multiple Univac 494's.

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On the Inside

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Has Many Ramifications

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New Tri-Data Tapes Save \$ for Users

MOUNTAIN VIEW, Calif. — A new, inexpensive, nearly error free cartridge loaded tape drive system is now available for users of PDP computers. The drive contains four separate tapes in two cartridges, and the separate tapes can be operated completely independently according to Tri-Data Corp., the manufacturer.

The unit supports complete plug-to-plug compatibility with PDP equipment using its own hardware for control and read/write logic.

Available either as a rack mounted unit or a desk top unit, the tape drive provides unusual error correction capability so that at least four dropouts have to occur before a single bit of data is lost.

The phase-encoded data carries information on two parallel tracks with clock cycle information coded as the result of the two tracks. The tracks are effectively complements of each other, therefore nearly eliminating the possibility of an erroneous read or write, according to company spokesmen.

The unit, called the CartriFile, operates at speeds up to 10 ips, a lower speed than the PDP unit, but sells for only \$5200 as compared with a price of \$17,650 for the least expensive PDP tape drive. The interface sells for an additional \$200, and permits the installation of the unit on any of the current PDP systems.

The unit can write either 4, 6, 8, or 12 bit words with completely variable record length. At 12 bit word size on 150 foot tape lengths, each cartridge holds 300,000 words in 1000 character records.

The unit records at 600 bits/inch density, and has a manual file-protect switch on the front panel. Data may be read and written simultaneously from different tracks, providing extensive overlap in operation.

The cartridges are available in three lengths, 50', 100', and 150' at prices of \$14, \$18, and \$21, respectively.



Tri-Data's new CartriFile tape unit installed on a PDP-8/S computer. The unit contains four separate tapes in two cartridges, and can be installed plug-to-plug.

Time Sharing Comparison Report Is Now Available

Special to Computerworld

SANTA MONICA, Calif. — The proceedings of the Nov. 25-27 National Information Research Institute workshop on time sharing and remote EDP services include the 10 copyrighted programs and instructions developed to demonstrate basic capabilities of available services.

The programs were designed by the institute to provide a "first cut" evaluation of time sharing services by yielding comparative performance data on the following test parameters: memory size, arithmetic speed, size of symbol table, testing of round-off errors, file creation, file protection, file editing, file access, program development, execution modes, and transmission error rate.

Time Sharing Parameters

The proceedings also include six tables of comparative detail describing other time sharing parameters such as: hardware features, executive control, edit

capabilities, file management capabilities, language capabilities, programming aids, rate structure of services, and cost efficiency figures derived from demonstrated performance of benchmark tests.

Printouts from 80 on-line tests are included.

Nine Systems Tested

Tests were performed on the following systems: Computer Time Sharing, Inc. (CDC 3300), Remote Computing Corp. (B5500), Computer Center Corp. (PDP-10), General Electric Mark I (GE 265), General Electric Mark II (GE 635), Tymshare, Inc. (SDS 940), Allen Babcock Co. (IBM 360/50), IBM Basic (IBM 360/50), and Quicktran (IBM 7044).

The full workshop documentation in two volumes is available for \$100. Orders should be addressed to National Information Research Institute, P.O. Box 3358, Santa Monica, Calif. 90401.

FCC Tariff Probe May Be Renewed

WASHINGTON, D.C. — The possibility of a new Federal Communications Commission investigation into some aspects of telephone company interconnection policies has been raised as a result of the filing of the Justice Department in the FCC's inquiry concerning AT&T interconnection tariffs.

At least 28 companies and organizations filed by the Dec. 2 deadline, with the majority urging rejection or suspension of all or part of the revised tariffs, but the tariffs become effective Jan. 1, as scheduled.

The Justice Department withdrew its previous request for partial rejection or suspension of the new tariffs proposed in September, but again called for the FCC to investigate the requirement that network control signaling units be furnished, installed, and maintained by the telephone companies. Justice proposed permitting the new tariffs proposed in October to go into force, "even though this means permitting the continued restriction as to network control signaling functions for what we hope would be the relatively brief period of time necessary to investigate this issue."

Areas To Be Probed

Areas which the FCC should investigate, the agency said, include (1) the likely reliability of network control signaling equipment, whether or not provided by the carriers; (2) the probability that telephone customers would not adequately maintain customer owned network control signaling equipment and the costs flowing from this, and (3) the feasibility of a less restrictive arrangement such as a compulsory maintenance contract for customer owned network signaling equipment.

Reiterating the position it had taken in the FCC's recent computer communications inquiry, Justice commented that the general prohibition against customer owned network control signaling devices could not be justified on the theory that providing such equipment was an indispensable part of the carriers' service, in the sense that duplication in providing such equipment would be prohibitively expensive. The only acceptable justification, the agency declared, would be that customer owned units would adversely affect the telephone company's operations or service.

Others who suggested that the tariffs go into effect Jan. 1 with a follow-up FCC investigation included the American Petroleum Institute's Central Committee on Communication Facilities and the National Retail Merchants Association.

ITT Objects

In its comments, ITT stated that the question of whether a telephone company furnished network signaling control unit must be used for interconnection of terminal equipment or a private communications system with the public telephone system was the only issue left unresolved. Noting that ITT manufactured equipment presently is

working with Bell System equipment and "producing precisely the same network control signals," ITT pointed out that, "AT&T nowhere asserts, because it cannot, that ITT's, Stromberg-Carlson's, or Automatic Electric's telephones are not compatible with AT&T's central office switching equipment."

Bema Adds Its Voice

The Business Equipment Manufacturers Association contended that the tariff revisions filed in October "remain less than fully responsive to the needs of the public, including the data processing industry and its users, for maximum beneficial use of telecommunications facilities provided by the common carriers."

Although some of its previous general objections were satisfied by the removal of the prohibition against connection of private communications systems, Bema said, it still had a number of specific objections, including one against the provision that an attendant must operate the network control signaling unit. The association asserted that it is "critically important that in the use of the message toll network by data processors, the data terminals should operate in an unattended mode (automatic)." Although it realizes that AT&T has declared that when an automatic arrangement has been developed it will offer this option to customers, Bema said, it urged "expedition of this capability in light of the expressed need of the computer industry."

One of the loudest protests came from Photo Magnetic Systems, Inc., of Beltsville, Md., and its subsidiary, Computer Telephone Corp. They said in a joint statement that AT&T "seeks by artful, misleading, and cleverly contrived language in its proposed revised tariff to retain the same or even stronger controls over so-called foreign attachments."

CSC Contract Is Renewed by Defense Agency

LOS ANGELES — Computer Sciences Corp. has been awarded a one-year, \$4.1 million contract for continuation of the computer-based services it provides to the Defense Communications Agency's National Military Command System Support Center.

The award is for services that CSC provides in connection with the agency's mission of technical support to the National Military Command System.

Dr. Stewart E. Fliege, eastern region vice president of CSC's Computer Sciences Division, said the award brings the total value of the contract to \$8.6 million.

The center provides automatic data processing support to the Joint Chiefs of Staff. It maintains files of information furnished by the military services and agencies of the Defense Department.

To Buy Stelma Stock

Data Products Selling Informatics Stock

CULVER CITY, Calif. — Data Products Corp. plans to sell its 62.5% ownership of Informatics Inc., California based software company.

The offering, to be made following the planned 2 for 1 split of Informatics stock early in January, will total approximately 800,000 shares, of which 752,000 shares represent the Data Products holdings.

Erwin Tomash, president of Data Products, said proceeds will be used to reduce an outstanding \$20 million loan incurred for the recent cash purchase of 40% of the outstanding common stock of Stelma, Inc. Stelma is a pro-

ducer of communication equipment and systems, headquartered in Stamford, Conn. Tomash said that steps are underway to acquire the balance of Stelma.

In the fiscal year ended March 1968, Informatics had sales of \$7,868,204 and net income of \$396,788 (\$273,993, or approximately 66%, of which was included in Data Products consolidated income), and Stelma had sales of \$17,702,000 with net income of \$1,788,000.

"We believe that the sale of our Informatics' stock and the acquisition of Stelma are in the best interests of both Informatics and Data Products,"

Tomash said. "The future of Informatics dictates that it be able to use its stock without regard to Data Products ownership requirement of at least 51% for financial consolidation purposes."

"The acquisition of Stelma, when completed, will be very beneficial to Data Products since it broadens the corporation base and increases the scope of activity linking both computer and communications technologies in the fast growing market areas of computer terminals, remote access, on-line, and time sharing."

System Speeds Stock Buys, May Help Eliminate Errors

Special to Computerworld

SAN FRANCISCO — A new offense against the paperwork plaguing stockbrokers is being made by an automated information system installed at the Pacific Coast Stock Exchange (PCSE).

Thomas Phelan, PCSE presi-

dent, explained that the Comex (communication and execution) system will make the exchange the first in the United States whose member firms can teletype orders to a central computer and receive back confirmation of the executed order.

The system is expected to be in

full use early this year. Initially, Comex will be used to execute odd-lot orders (less than 100 shares), Phelan said, but later the system will be programmed to execute round lot orders.

Error Reduction

Comex reduces the number of steps ordinarily required to just one simple Teletype entry. "Member firms will find their work loads eased and their error potential reduced while their order capacity will be greatly increased," Phelan noted.

Comex will allow any members to transmit an order to either of the exchange trading floors (San Francisco or Los Angeles). The computer complex behind the system will accept the order and execute in accordance with normal handling procedures. Comex is compatible with all member firms' private wire networks, thus making the new service available to each through the single access of his Teletype terminal.

When a broker's order is entered and the transaction has been made, the specialist in that stock is automatically and im-



Confirmation of an order executed by the Comex system is discussed by Thomas Phelan, president of the Pacific Coast Stock Exchange, and Richard Gross, a stock specialist.

mediately notified at his post on the trading floor. Simultaneously, the broker who entered the order receives confirmation of execution, noting such details as price, number of shares, stock symbol, and the customer's order number.



A buy order is transmitted via Comex by Charles Marcus in the New York office of E.F. Hutton & Co. Watching are James T. Gahan and Norman M. Epstein, vice presidents of the brokerage firm.

Communications Network Gets Its First Customer

NEW YORK — Info-Com, Western Union's nationwide shared-use communication network for business firms, has gone into operation with inauguration of service for Montgomery Ward.

The service provides each subscriber with a private, computer controlled, multistation network at shared-system savings.

Ward is using Info-Com (Information Communications) to link its Chicago corporate office with 17 Ward facilities coast to coast. The system transmits messages at 100 words a minute.

"The shared-system service gives us the advantage of a private, computer operated system without the expense of having to lease or purchase our own computers, and that makes a big difference," said L.K. Howell, Ward's Corporate Communications Manager.

Service is provided through Western Union's computer center in Chicago. As Info-Com expands, computer centers in New York and San Francisco will also be used. Each center is equipped with two Univac 418 systems.

Sending points prepare messages on a teleprinter which produces a punched paper tape and hard copy. The tape is inserted in a transmitter and the message is sent to Western Union's computer center.

The computer selects the terminal on which to deliver the message, checks to be certain it is the correct terminal, and then transmits the message.

As a double check, the computer verifies, by means of an

automatic answer-back, that the right terminal has been reached.

Besides communicating with stations on their private Info-Com network, subscribers can use their teleprinters to communicate with Western Union Telex subscribers, to send messages to subscribers of the Bell System's TWX service, and to send telegrams through Western Union's public message network.

All Info-Com stations, regardless of class of service or level of code transmission, can communicate with each other because of automatic conversation facilities. In addition, all stations have message retrieval capabilities, two levels of transmission priority, and alternate delivery features.

Info-Com provides three classes of service: Class 1 for heavy volume users operates at 100 wpm over direct access lines. Class 2, also at 100 wpm, but suitable for medium volume service, has access through shared facilities. Class 3, for low volume at 66 wpm, accesses through Western Union's Telex network.

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REPRESENTATIVES IN OTHER MAJOR U.S. CITIES, CANADA AND EUROPE.

Editorials

Good Name of the Community

It is impossible to ignore the antitrust suit which Control Data has brought against IBM. Its financial aspects may be tremendous. But far more important to the computer community at large are the many side issues which directly and indirectly call into question the conduct of many of the people and organizations in the industry.

If Control Data's statements are true — and on that we have no opinion at this point — then many people have been much less than perfect in their conduct. The bright light of publicity which is never far from the wonders of computers may bring national attention to some improper happenings in our industry. Our enemies may well try to use this publicity to smear us — and to try to push aside or to inhibit some computer-related projects. We may have little effective defense against this.

Nor can it be said that we have not been warned of these possibilities. Early last year when *Datamation* — the undoubted leader among our industry magazines — was called to task for saying that Control Data was effectively a "confidence trickster," the magazine "apologized" by saying that Control Data was no more a "confidence trickster" than any of the other computer firms! And "no less so" was the obvious implication.

Despite this, we took few precautions against adverse publicity. We hope that Control Data fully considered the potential damage to the good name of our industry that their suit may bring.

Whether or not the complaints are true, now is the time for the industry to begin policing itself — before the government begins regulating it.

Two Major Achievements

Dr. Herbert Grosch appears to have taken a beating in the recent meeting on how Cobol standardization should be implemented. Indeed, between the representatives of some government agencies (who were conspicuously silent) and of various groups (who were outspokenly but constructively critical) there was precious little left of his original position when the meeting closed.

However, he was left with two major credits which should not be ignored. He had brought people together — and persuaded them to be constructively critical. This means that the final implementation will certainly be improved — and that is very important.

Moreover, he had done it openly — where the users could see what was being decided. He had done without the secret gatherings which a number of our so-called "representative" groups claim are necessary. And he had resisted the pressures of some of the hardware and software manufacturers to keep the news away from the users.

These are two very major achievements which greatly outweigh any technical knockout.

Make War, Not Love

Whereby Cupid Gets Involved In a Commercial Cross-Fire

CW has been receiving since last spring a steady flow of news releases announcing software packages with such exotic names as *Flirt*, *Code*, *Cupid*, *Fog*, and *Isis*. All were from a firm called *Economatics* and all bore the notation "Contact: Dr. Phillippe A. Clavier." At first we suspected someone was putting us on. Later we confirmed the announcements were for real. But finally our curiosity got the better of us, and we asked *Economatics* for more information. This is the company's reply, headed "Cupid Makes War, Not Love."

PASADENA, Calif. — Cupid is just one of the exotically named programs in the library of *Economatics*, a Pasadena software firm. The program acronyms all suit — sometimes ironically — the functions performed: Cupid is a war-gaming technique that predicts the outcome of gasoline price wars; Fog predicts company growth; *Ibid* uses the results of past open bids to improve a company's chances of getting a job while leaving a minimum on the table; and *Isis* (Egyptian goddess of fertility) assesses the chances of meeting sales projections.

The program names may show a touch of whimsy, but the goal of this new software firm is cut and dried — establishment of a company that makes computer-aided management a reality. Dr. Phillippe Clavier, *Economatics* president, describes the approach:

Goal: Decision Making

"We're the only software firm supplying a tool aimed at decision making, not just data processing. This is the area that so far has received the least assistance from computers, yet could use it the most. Management is a series of gambles. A computer can be used to hedge the bets.

"Our programs use the data processing capabilities of the computer to manipulate simulations, but with a difference. In the typical simulation, the manager uses several runs on the computer, changing the inputs for each run, to get a list of possible results for different strategies.

"But, this is just another list of numbers. It still has to be evaluated by the manager. And this is where our programs take off. With each result, the manager gets a 'risk factor' in the form of a confidence level. With this he can assess his possible moves on the basis of 'Which result is most likely to occur?' rather than 'Which result looks best?' The manager is now on a firmer footing, less dependent on 'intuitive judgments' or hunches.

"And our programs are based on more than just probabilities. It's useless to know that in 8 out of 10 tries you would be successful, if you go bankrupt on the first try.

Choosing the Odds

"With our programs you choose the odds you

want, then the computer defines the result that could at least be expected with those odds. It's a bit pessimistic, but very realistic.

"So far, we have applied the techniques to common business problems like inventory control, predicting sales and profit before a product hits the market, project control (Can you see Pert/Cost without its charts and with automatic exception reporting? That's our *Peac*.) and several others.

"The technique lends itself readily to rapid tailoring so we are expanding our library almost on a monthly basis."

About Dr. Clavier

Dr. Clavier speaks from a background of 20 years of experience in industrial research and management. He has made scientific contributions to electron-optics, information theory, plasma physics, re-entry physics, theoretical physics, and mathematics. He has authored dozens of papers and has over 40 patent applications to his credit.

Dr. Clavier's last position, prior to forming *Economatics* earlier this year, was with a research oriented firm, directing the study of offense-defense strategies for the Department of Defense. He developed a computer simulation of nuclear attacks, but found that an evaluative method was needed. Applying confidence statistics to the simulation, he found an extremely powerful forecasting tool.

Beating the Plowshare

The application of the same methods to management resulted because, as part of management, he was involved in budgeting and business projections. The inadequacies of existing techniques prompted him to scrutinize economics in depth. He discovered a surprising fact — mathematics developed in quantum mechanics could be applied to economic factors. He now had a mathematical model to which he could apply his war-gaming techniques.

On Feb. 1, 1968, *Economatics* was incorporated. Since that time, the company has developed a library of programs that hit the problems of management on three levels: the level of *operational control* with programs like *Peac*, an automatic, predictive replacement for Pert/Cost; the level of *tactical control*, with programs like *Callif*, a forecast of cash flow and labor load fluctuations; and the level of *strategic control*, with programs like *Sibil*, an assessment of the "make or buy" question to yield the best profit. Only these types of programs are developed. No "data" problems are considered. The reason for this is explained by Dr. Clavier:

"The lack of an integrated management oriented system has been decried by many. By addressing ourselves to decisions — not data — we have taken the first significant step towards such a system."

Letters to the Editor

Virtual Memory

To the Editor:

Based on reading your editorial on the 360/67 "Virtual Memory" concept [CW, Dec. 11], I felt compelled to write and ask the question, "So, what else is new?"

The Burroughs Corp., in the form of the B5500 initially and the B3500 later on, has been using this concept for at least five years. Through automatic segmentation by the various compilers (Algol, Cobol, Fortran, Basic) a segment dictionary is created at compile time which shares disk storage with the object code generated.

When the MCP (Master Control Program — i.e., operating system) "fires up" a program, it keeps (1) a Program Reference

Table (PRT) and (2) a "stack" for each program. Through an interrupt system (second to none), the MCP (and hardware) senses the presences or absences of a given segment of code through bit 46 of a 48 bit word that is called a Descriptor. If present, the code is executed; if absent the program is temporarily "put to sleep," any other program in memory that can be "awakened" is, and then the MCP through floating channels tells the channel to fetch the code needed and put in a pre-selected area of core, put the address of it in the low order 15 bits of the Descriptor and turn on the Presences bit.

The normal mode of operation in the B5500 is multiprogramming (up to nine jobs), and if there are two processors, then

both multiprogramming and multiprocessing. The programmer is completely free of memory size restrictions and also burdensome "multi-phasing" as I like to refer to it.

We at the Department of State Highways have been using this equipment and concept for two years and know of many other satisfied users. Our "normal mode" is three to five jobs running plus Data Communications. We run approximately 12,000 jobs through the system monthly on a two shift, five day week basis. We do this on a single processor (maximum two), six memory module (maximum eight), two floating channel (maximum four) system.

Edward J. Lenon
Lansing, Mich.

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Research Report

Subtasking Can Save Both Time and Core

By Peter L. Briggs

Of the CW Technical Staff

With the constantly upgraded software available from manufacturers today, it becomes increasingly difficult to relate the new techniques to the problems which every user faces in his installation. Every time a new feature is added to the system, the user must analyse its effect on his special problems, his manpower, and his long range planning.

Frequently, the user finds it necessary to spend more time looking at these new features than he does planning for his own installation's expansion. This problem is especially true in installations where the system software represents the major bulk of the user's design criteria.

Recently [CW, Dec. 25] IBM announced additions, scheduled for next spring, to the multiprogramming capabilities under DOS for the System 360 line.

The actual changes are described under the category of "subtasking," the capability of running user programs as subsidiary programs to other user programs.

What Is Subtasking?

The name, "subtasking" is self-descriptive. Consider the situation where a special error situation develops. It is decided that, when this situation occurs, a special exception report should be prepared for management. It

is certainly undesirable to waste the core necessary to build into the program the routines to create this report. The system is very busy with the normal process of handling its files, answering questions from remote sources, or other such activities. You don't want to stop the mainline processing of the system just to print out this report. If you choose a subroutine, then control must pass from your main program to the subroutine until the report is generated. By using a "subtask," you can effectively multiprogram your report with the main program, therefore letting the system carry out its normal functions in the same time frame while it generates this report.

Thus, subtasking gives the user more room to maneuver in his system, reduce his processing waste, and still fulfill his objectives.

When Should You Use It?

Under what conditions will subtasking gain you something? In the environment where the resources for a given program are limited by time, availability of devices, and response time, then this internal multiprogramming can gain you much.

In a batch environment, it is just as effective to use a subroutine, because there is no activity of sufficient priority to demand more resources from the system. In the on-line environment, how-

ever, the availability of devices such as printers, tapes, disks, or console printers is very limited.

With subtasking, the user can simply "attach" his subtask, and let it wait for the specific device, while the main program continues to run. This can actually save you quite a bit of money. The system resources are kept busier, the program spends less time

waiting, and a smaller system can sometimes be used than would otherwise be required.

What Does It Cost You?

According to IBM, the overhead for subtasking is about 2000 positions of core. This could well be critical for very small systems (e.g., under 64K) because they are already trying

to save every spare block of core possible. In a larger system, this is probably not critical, because 2K of additional core is a small percentage of the available amount. There will certainly be an operational overhead, consuming additional machine cycles. This overhead will probably be offset by the overall time saved in running the program.

How Difficult Is It to Use?

It should be as easy to use as the current calling sequence for subroutines, according to an IBM spokesman. If the additions live up to this claim, then the user will face no additional programming burdens.

There will be a definite burden at the user's design level. The designer must take into account the proper design criteria to make maximum use of subtasking, and he probably will find that discussing the problems with a user of the full operating system under which this technique has been available for some time, will be helpful.

There will have to be certain additions to the compilers to interpret the statements attaching these subtasks to the main program, and some means of notifying the program of the completion of the subtask must be provided. These alterations should not require any significant learning problem for the user's programmers.

Some Pertinent Questions

Q. What specific types of systems can use the changes to advantage?

- A. 1. Systems where exception reporting is desirable.
2. Message response and terminal handling systems.
3. CRT display oriented systems.
4. Systems where there are occasional very slow file searches.

Q. What type of users will be affected?

- A. Those users who are using or contemplating on-line systems.

Q. Will changes to existing programs be necessary to use the features?

- A. Yes. The system must be redesigned to take advantage of this feature. Actual reprogramming might not be significant, however.

Q. Will much training be required to take advantage of this feature?

- A. Quite a bit of training will be needed for program designers, very little for programmers.

Q. Will there be any definite disadvantages to using this feature?

- A. Yes. 1. 2000 bytes of additional core for the supervisor.
2. Slightly higher system overhead in operation.

Q. Will there be any specific advantages in using this feature?

- A. Yes. 1. Shorter response time for inquiries and replies.
2. Less time for the system spent in the Wait state.
3. Less complicated and smaller main programs.

Letters to the Editor

(Continued from Page 4)

To the Editor:

Praise should be given to University of Michigan's Professor Bernard Galler and the people at IBM's Scientific Center for developing the necessary hardware and software to liberate the programmer from the physical limitations of core memory on the IBM 360/67.

However, ... four months ago we received the Burroughs time sharing package and have been offering customers the ability to run extremely large programs economically on the B5500.

If credit is to be given for the revolutionary accomplishment, it should be given to the Burroughs people who explored this concept and made it work in the field.

James P. Boron
Marketing Staff

Direct Access Computing Corp.
Southfield, Mich.

To the Editor:

We have been offering such services to the public since earlier this year using a time sharing system jointly developed by the Burroughs Corp. and Remote Computing Corp. for the B5500.

The time sharing system on the B5500 performs quite well using any hardware configuration over the minimum, with no software modifications. We may operate with one or two processors, in contrast to the CMS/CP67. Further, all compilers automatically segment source programs based

on the logical structure of the particular language using a variable length segment of up to 8K characters.

And economy? A competitive analysis clearly shows that our services are more economical than any one of several established services now available.

The claim of the Computer Software Systems that it "can provide up to 40 times more problem solving power ... based on the ability to provide extra memory space for users" is highly misleading to the general public.

In the light of these ... facts, your editorial statements ... seem a bit out of place, would you not agree?

A.P. Weeks
Manager, Los Angeles Branch
Remote Computing Corp.
Los Angeles

Computerworld did miss the impact of the recent provision of time sharing on the Burroughs 5500s — but we did not intend to slight anyone. We yield to no one in our admiration of the designers of the Burroughs 5500 series — and we said so as early as our first issue and as recently as our Dec. 18 issue. Ed.

Memo From Sydney

To the Editor:

I want to congratulate you on the great job you're doing with Computerworld. It is an excellent paper; a real pleasure to read, and very informative es-

pecially to my staff and me "down under."

W.J. Finnegan
Branch Manager

Honeywell Pty.
Sydney, Australia

Who's Kidding Who?

To the Editor:

Several recent issues have carried articles concerning the contradictions and conflicts contained in IBM's PL/I language. These articles, although probably very significant to the success or failure of systems using PL/I, highlight one of the most basic problems of the EDP field.

The EDP professionals (and I am a novice with 5-1/2 years in the field) can't see the forest for the trees. The Cobol controversies are almost as old as the supposedly practical usage of computers to solve business problems. Now we have another major crusade in Cobol vs. PL/I. And gloriously on the horizon, appears the new problem of PL/I vs. PL/II (or whatever).

All this is ludicrous when the truth of the matter is that most of the EDP professionals don't even recognize the reason that the computer was developed. The basic programming problems are not that the compilers won't work. They are not the issue of whether a programmer can code instructions faster using one language than another.

The basic programming problems arise, and remain, and will remain, from the problem of the lack of understanding by EDP

professionals of the basic needs of the business they are supposed to serve. It doesn't make a damn bit of difference how the program is constructed as long as the results are profitable (remember that word?) to the business using the computer. If we used the same criteria to evaluate EDP installations as manufacturers, say, did to evaluate their production equipment, how many installations would remain? Yet, isn't this the type of test we should apply?

Until the EDP profession recognizes the fact that intensive training is required in the partic-

ular business problems that require solutions before intensive EDP training can begin, all these articles, seminars, etc. on PL/I, Cobol, Bomp, and many others, are just so much garbage.

We need people in our profession who can recognize and evaluate business requirements a lot more than we need the language experts. Until we develop these people, we're kidding ourselves about our "contributions" to the business world.

H.B. Dawson
Systems Analyst
Union Steel Products Co.
Albion, Mich.

TLW Computerworld Corner	
	INDUSTRY
Item 1: 360/20 C1, 8K, 2560 A1, 2203. AVAILABLE 30 days.	Construction
Item 2: 1401 C4, 1402-1, 1403-2, 1406-1, 4-729 II's. Advanced Programming, Print Storage, Numerical Print, Hi-Lo Equal, and others. AVAILABLE 11/68.	Food
Item 3: 1401 C4 8K with 1402-1, 1403 and 3-1311's. AVAILABLE 90 days.	Manufacturing
Item 4: 1401 C4 12K, 1402-1, 1403-2, and 1406-2. AVAILABLE 30 days.	Banking
Item 5: IBM 1401 E5 12K with 4 7330's. AVAILABLE 30 days.	Banking
Item 6: 1401 C3 with Advanced Programming, Hi-Lo Equal, Print Storage, Serial I/O Adap. and 800 CPI. AVAILABLE 30 days.	Utility
Item 7: 7070 System 15K, 7150, 7301, 7501, 7600, 7604, 7802, and 8-72911's. AVAILABLE 30 days.	Rail

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Editorial

The Year of the Threshold... 1968 Was Only a Beginning

The year 1968 has gone, but we are still greatly affected by its happenings, many of which are as yet undigested. Like every year, it was revolutionary. Unlike other years, however, the revolution could be seen only as a threshold to the outcome of specific developments.

There have been few other threshold years in the short history of computers. For instance, 1964 saw the introduction of the IBM 360 and the production and installation of the Honeywell Series 200. But at the end of the year the situation was only a difference in degree. So 1964 was not a threshold year.

But 1968 was. The year opened with a well structured industry. Hardware, software with its operating systems, telecommunications, real-time systems — each had their own disciplines. Time sharing held its promise for the future. And many people all over the country were able to follow developments.

As the year ended, we had an industry which stood on the verge of confusion. Many of its basic structural pillars were crumbling, and vigorous new blood without a "me too" attitude was entering many areas. It was possible to comprehend implications of not more than a section of the industry.

1956 a Precedent

Similarly, at the start of 1956, almost everyone in the industry knew everyone else. If not by name, certainly we knew their installations. Computers were personal things, and the vagaries and sheer stubbornness of some of them were as well known in the community as the features of Bette Davis or Cary Grant. When the year ended, it was clear that this group familiarity was gone forever. The advent of more and more computers limited most of us to the level of a single manufacturer's user group. We lost something which presumably we shall never regain.

But we gained something — new strength, an independence of outlook, an appreciation of both our importance and unimportance in the scheme of things. We saw the sciences and businesses beginning to realize that computers lead to new and necessary advances and were no longer simply in the field of research. We lost some of our comforts, but we gained in maturity.

1969 Prospects

With the approach of 1969 we have a similar loss, and hopefully a similar gain, in the confusion that has followed the Carterfone decision, which is opening telephone networks to much wider operations; in the proliferation of disk pack manufacturers; in the threat of a price war; in the decision of IBM to change its marketing methods; and in the ignorance of not knowing what those new marketing methods will be.

There has been a loss of understanding, a loss of quick comprehension of the impact of any particular item. Walking around the exhibit area of the Fall Joint Computer Conference in San Francisco, one heard many people comment, "There's just too much. I can't take it all in." Those who previously had a good grasp of what was going on throughout the industry were looking at new products but seemed unable to integrate them. No longer was there a oneness to the industry.

The Gain

Against this loss there was an equal, or greater gain. While observers were unable to take in the whole industry, they were excited about those parts they were still following. Where previously they had one or two opportunities, now they had seven or eight, and were discovering the truth of the poet's words, "What can they know of England who only England know." They were realizing for the first time elementary points about the input they were trying to get into their systems — simply because they had been trying to decide on the best keying input method, trying to

choose between optical character recognition and the many different key-to-tape systems being offered during the year. They were beginning to realize the impact of errors that were springing from the system, and the opportunity of minimizing them, through being careful in the choice of systems to minimize them.

Mundane Points

If there was any common ground, perhaps it was best brought out by William C. Norris, chairman of Control Data Corp., in an address to a group of security analysts. Norris did not omit the glamor of the super scale computer that his company produces, but he gave even more attention to supposedly mundane items such as effective air conditioning and cooling systems, generators, reliability, and availability. These were the items he found of prime interest.

No longer was the question: "Can I do this within the price I am prepared to pay?" The question had now become: "Of the number of ways available to me within my price budget, which is the best?" It often occurred that the answer was to be found at the man/machine interface with emphasis on quick and easy recognition and elimination of error. Here it was that the mundane points, such as the size of the working space for a console, the positioning of a scope in relation to the operator's eyes, the design of a type face, or the phrasing of a dialog, turned out to be the critical element.

Back to Nitty Gritties?

This is a real threshold. Its implications for the future are not known. It certainly means that we have to cope with a great deal more data than ever before (and, goodness knows, it was already a flood!). We have to get into the nitty gritty areas we thought had been left behind years ago when we came out of operations research. We have to face the inevitable reorganizations, redistributions of tasks, and rebudgeting that will be necessary to cope with our jobs effectively.

Unknown Future

We must do this in a comparatively non-structured market. So many things are still up in the air. Who knows what will be the position on the patent question, on privacy, on data banks, on communications, to name a few? Where and who will be our colleagues in the field? More importantly, what education will they need? How much will they cost, and what are the promotion prospects we can offer to make their careers, not merely that overworked word "challenging" but productive for both parties? Who knows what scandals will develop from the misuse of computers and from embezzlements and other civic nuisances?

We do not know, and yet we must be prepared. This is what we are paid to do. Anyone in a young industry must expect the unexpected. The challenge is to move forward, to comprehend any situation, to see what is best for ourselves and for our employees, to determine how to use the resources made available to us to their maximum capacity, to see that our social responsibilities are not ignored, and to see that we do not impede the productivity of our systems.

We Must Communicate

Above all, we must communicate effectively with those around us so that as we begin the year 1969 we are fully prepared for the future. We will have to break many guidelines, make many new rules, set up new departments, new disciplines, and take on new responsibilities. The new year, 1969, will be quite a year, and *Computerworld* sincerely wishes all members of the computer and ancillary professions a heartfelt wish that it be a happy one. — A.T.

IBM Separate Pricing Was Year's Top Story

The Big Daddy story of 1968 may well turn out to be Control Data's antitrust suit against IBM. But at this point, it's impossible to rate this story against the other major events of the year, so it has been left out of *Computerworld's* selection of the Top 10 stories of 1968.

The other stories, as rated in importance by CW's editors, are as follows:

1. IBM announces it will change its pricing policies by July 1, broadly indicating it will begin charging for at least some software.
2. The General Services Administration begins modifying its procurement practices as a result of the controversy over Phase II.
3. The first software patent is issued and the Court of Patent Appeals rules that software is patentable.
4. Cohol is adopted as a standard by the USASI and then the Defense Department.
5. The Rubey Report on PL/I is released.
6. The foreign attachments tariffs are ruled unlawful by the Federal Communications Commission.
7. Computers make a poor showing in handling presidential election results.
8. Questions arise as to who is covered by, and who will enforce, the ethical guidelines of the Association for Computing Machinery.
9. A jury awards damages against IBM in a user suit over system reliability and support.
10. A \$39 per month data processing system is announced by Viatron.

IBM Announcement Came as Surprise

On Dec. 6 IBM sent waves through the computer world by announcing that it was conducting a study "to determine what support services should be separately offered and priced" and that "no later than July 1, 1969, it expects to make changes in the way it charges for, and supports, its data processing equipment."

Suddenly all the debates over the effects of separate pricing for hardware and software ceased to be academic. Suddenly it was not "what would happen," it was "what will happen?"

Coin Has Two Sides

Separate pricing advocates have maintained the hardware will cost less, possibly as much as 15% less, and that this extra money will pour into the independent software houses "because they write better stuff anyhow." But others have warned that IBM, already "the biggest software house in the world," may be able to sell its software for less than the independents because of its huge number of users.

Industry sources speculate that IBM will continue to supply free the software, such as operating systems, fundamental to the operation of its systems but will charge for applications software.

Back at the Ranch

Meanwhile, the users are stewing a bit. Although rental users probably will not be affected, owners and third party lessees could find themselves paying for services that formerly were free.

The egg has been laid — but it may not hatch for another six months.

2) Phase II — And After

Last January, the Air Force announced the final chapter of

the controversial Phase II procurement. Burroughs Corp. was awarded the contract, amounting to \$60 million, as opposed to the original \$114 million awarded to IBM.

The results of this re-examination have gone a long way toward improving the techniques used for procurement of federal systems. Most of the systems called for in the contract (135 B3500 systems) have already been installed. The remainder will be installed by July 1, 1970.

The next stage occurred when the General Services Administration announced that, for the new "offer to bid," there would be a requirement that manufacturers live up to every claim in their sales literature, brochures, and other related material given to the government in conjunction with procurements. Clauses were provided to charge the original manufacturer with the costs of changing manufacturers should equipment prove unsatisfactory.

In addition, peripheral manufacturers who made "plug-for-plug" compatible equipment were to be given preference on the procurement schedule. This made it more than likely that tape drives, disks, and other such devices where compatibility could be proven would have priority over the computer manufacturer in supplying peripherals.

Lose One, Win One

The price reductions which the government requested were not agreed to by the manufacturers, but the new responsibility clauses were accepted.

The third act opened with L. Richard Caveney of Bryant Computer Products contending that independent peripheral manufacturers were not re-

(Continued on Page 7)

GSA Stiffens Warranty Requirements

(Continued from Page 6)

ceiving proper treatment from the Government Accounting Office. He contended that it was economically unfeasible and generally very difficult for independent peripheral manufacturers to bid on sections of a computer system under current practices.

The cost of bidding was said to be prohibitive and the attitude of the GSA unfavorable. Caveney's protest was denied by the GAO.

Some Make the List

The director of the GSA, H.A. Abersfeller, then invited some 50 independent manufacturers to apply for a position on the procurement schedule. Several firms applied. It was later announced that the GSA had entered into contracts with two.

The next step came when the GSA announced that the manufacturers were going to be required to supply cost breakdowns on their equipment next year, a requirement already enforced when purchasing from all other industries.

The entire procurement situation is "under study," a GSA spokesman told a CW staff writer recently. The GSA has not yet satisfactorily dealt with the problems, nor has it proposed comprehensive guidelines to give adequate protection to

nolds, first assistant commissioner of the Patent Office.

One of the basic issues involved was whether the program itself was actually patented or if the "technique" was patented. To be patentable, an item must be an art, a machine, a manufacture, or a composition of matter.

It is possible that a program could be considered as a machine, since each time it is loaded, it creates a unique special purpose machine.

The other category possible is that of an "art." The U.S. Supreme Court has defined an "art" as, "a mode of treatment of certain materials to produce a given result."

The Patent Office then published a guide, indicating that software was unpatentable under the definition of "process." They contended that any "process" which could be performed solely as a mental process was inherently unpatentable. At that time the Patent Office undertook a broad study of the entire patent problem.

Landmark Case?

The most recent act in this area was the decision, by the U.S. Court of Patent Appeals, that any process which could be performed without human intervention, whether or not it could also be performed as a mental



"My kind of town."

This is how the San Francisco Chronicle viewed the finding of large blocks of uncounted votes in San Francisco. (Reprinted by permission.)

developed under the direction of Cmdr. Grace Hopper, enable a user to determine the degree to which a compiler meets language standards.

Then last month a squabble broke out over what a "standard" Cobol should include. Dr. Herbert Grosch of the National Bureau of Standards favors a "floor to ceiling" concept; i.e., each level should contain no more nor less than the standard calls for.

The manufacturers disagreed. They felt that a floor was enough for now and that pre-compilers would provide enough protection for users. In this they had the support of Cmdr. Hopper, who felt the standards have not been around long enough to define where a ceiling should be placed. She has long believed that pre-compilers (programs which analyze the source coding to determine whether it fits the standard and what facilities are needed) will provide adequate protection for users.

5) The Rubey Report

Early in the fall, the Air Force released a 283 page report with the innocent title of a "Comparative Evaluation of PL/I." This detailed comparison of PL/I with Fortran, Cobol, and Jovial had been conducted by a team headed by Raymond J. Rubey of Logicon, Inc.

The study was a landmark in language comparisons. But CW disagreed with the conclusions and made a detailed study of the report [CW, Nov. 6, 13, and 20] and concluded that the way in which the study was conducted and the way in which results were analyzed had biased the findings in favor of PL/I.

CW's conclusions, based on the data in the report, was that PL/I is difficult to learn, error prone, and more suitable for professional programmers than for the average commercial programmer.

Standardization

Meanwhile, attempts were being made, under USASI, to determine whether PL/I was suitable for standardization. One faction felt that PL/I was in need of immediate standardization, another felt that, due to the lack of readily available information, PL/I was not ready for standardization.

The first revised set of tariffs filed by the telephone companies brought such a cry of anguish from users and the Justice Department that the telephone companies quickly filed a second, more liberal, revision. More anguished cries were heard and, although some including the Justice Department urged letting the tariffs go into effect and revising them later, it appeared their implementation might again be delayed.

In the meantime the old tariffs, with the exception of the rules relating to Carterfone type equipment, remain in effect.

AT&T vs. the Users

American Telephone & Telegraph Co., spokesman for the telephone companies, is trying to hold onto as much control over equipment as it can, contending such control is necessary to protect the network. The users, while agreeing that user owned equipment must meet reasonable standards, contend that AT&T is simply trying to maintain its virtual monopoly in supplying equipment.

7) Election Errors

The biggest losers in the 1968 presidential election were computers. While the many failures in counting and correlating election results eventually were traced to software and human errors (one brave election official said, "Maybe our people aren't ready for data processing yet."), the public only knew what it saw on TV and read in the papers.

In San Francisco, where 13,000 votes went uncounted for two weeks, the San Francisco Chronicle commented editorially: "Computerization of the results, introduced last June, was supposed to be the chrome-plated, modern way to get instant decisions. It has led both to long delays and, as we have seen in the recent election, to ludicrously incomplete counts."

The paper suggested the city return to adding machines and concluded: "Backward to progress!"

To the Defense

Syndicated columnist Don Maclean came to the defense of computers, pointing out that they could reduce corruption by providing quick counts. Any officials who withheld ballots long enough to tamper with

(Continued on Page 8)



Navy Cmdr. Grace Hopper and Dr. Herbert Grosch wound up on opposite sides of the fence in the controversy over implementing the USASI Cobol standard.



the government and the taxpayers, according to Caveney.

3) Software Patents

The software patent uproar began when the President's Committee on Patents and Copyrights withdrew parts of section 106 of the proposed patent guidelines. Section 106 originally said, in part, "A plan of action or set of operating instructions, in whatever form presented, to cause a controllable data processor or computer to perform selected operations shall not be patentable." This part of section 106 was included to eliminate the problem of finding prior art in the field where such information is not generally available.

Then the Patent Office issued a patent to Martin A. Goetz of Applied Data Research for an oscillating sort technique, defined by the use of narrative, with a flow chart for formal definition.

Not Really a Landmark

"It may be invalid. We issue valid patents every day," was the reaction of Edwin L. Rey-

process, fell within the range of patentable material.

The Patent Office has asked the court to rehear the case but has agreed that if the decision stands software would be patentable.

4) Standardized Cobol

Cobol became a standard language in 1968 with the adoption of a four level version by the United States of America Standards Institute (USASI), a nonprofit trade group with quasi-legal authority. The action climaxed nine years of effort.

The standard approved was very similar to Cobol-65, except that four levels, instead of two, are defined.

The Department of Defense then announced that it was adopting the standard. As the largest government computer user, the department in effect has set the precedent for use of the standard.

Testing the Compilers

In the meantime, the Navy announced that the first of its programs for testing Cobol compilers was available. These tests,



Viatron's data processing System 21, one of the newsmakers of 1968.



COMPUTERWORLD

education

Moore School Formally Establishes Graduate Computer Science Group

PHILADELPHIA — The University of Pennsylvania has formally established a graduate group in computer and information science at its Moore School of Electrical Engineering.

Although a CIS curriculum has existed since 1959, the need for an integrated curriculum and corresponding research program was clear, said Dr. John G. Brainerd, director of the Moore School. There are 235 graduate students this year who have designated CIS as their primary interest. Research projects have expanded accordingly, he said.

The group will be chaired by Dr. John W. Carr III, professor of computer science. The faculty will include five full professors and offer some 30 advanced courses in CIS. In addition, more than 40 related courses will be available outside the Moore School.

Cal Poly to Offer a Degree in EDP

SAN LUIS OBISPO, Calif. — A four-year degree major in computer science has been approved for California State Polytechnic College.

It will be a new curriculum in new facilities for new kinds of occupations brought on by the technological revolution, according to Dr. Clyde P. Fisher, dean of Cal Poly's School of Applied Sciences, which will offer the new bachelor of science degree in computer science.

The program is one of the first of its kind established in the 19-campus state college system.

Students enrolling in the computer science major will share Cal Poly's new \$1.6 million computer science building with students studying mathematics and architecture.

College to Use Radio Station Computer

ATLANTA — Georgia State College, in cooperation with the Cox Broadcasting Corp., will offer a new programming course this month. In addition to formal classwork at the college, the course will consist of hands-on training at CBC's Data Processing Department.

The evening course, offered through Georgia State's School of Special Studies, will be limited to 60 students (20 in each of three classes). Computer training will be held on Saturdays at CBC.

calendar

Jan. 10-11, Washington, D.C. — "New Computer Assisted Concepts in Electro and Vector Cardiography." Contact: American College of Cardiology, 9650 Rockville Pike, Bethesda, Md. 20014.

Jan. 13-15, Washington, D.C. — Institute on Management and Technology in Printing and Publishing. Contact: The American University, Center for Technology & Administration, 3900 Wisconsin Ave., N.W., Washington, D.C. 20016.

Jan. 28-31, Ellenville, N.Y. — 1969 International Symposium on Information Theory. Contact: IEEE, 345 E. 47th St., New York, N.Y. 10017.

Feb. 13-14, Las Vegas, Nev. — Adapso Management Conference. Contact: J.L. Dreyer, Adapso, 420 Lexington Ave., New York, N.Y. 10017.

Mar. 24-26, Tallahassee, Fla. — 10th Meeting of VIM (Control Data 6000 Series Users). Contact: Dr. E.P. Miles, Jr., Prof. of Mathematics, Florida State University, Tallahassee.

ACM Calendar

Management Science

Feb. 5-6 Americana Hotel, New York.

Computer Selection and Evaluation

Jan. 30- Sheraton Chicago Hotel, Chicago.

31

Feb. 13- Marriott Twin Bridges Motor Hotel, Washington, D.C.

14

Feb. 17- Warwick Hotel, Philadelphia, Pa.

18

Mar. 13- Somerset Hotel, Boston.

14

Mar. 20- Hilton Inn, Tarrytown, N.Y.

21

Enrollment forms and further information are available from ACM Professional Development, 211 E. 43rd St., New York, N.Y. 10017.

EDP Language Program May Stop Dropouts

LOS ANGELES — "Acquiring the special language of digital computers may significantly reduce high school student dropout rates," theorizes B.J. Hoffman, a behavioral scientist.

"The theory that a knowledge of any second language, in this case computer programming, will broaden a student's outlook and motivate him to stay in school will soon be tested under scientifically controlled conditions," said Hoffman, who works for Scientific Data Systems.

SDS, aided by city, county, state, and university educators, will sponsor classes for approximately 100 junior and senior high school students from the Compton School District. The classes will introduce these students to the vocabulary and operation of digital computers and, theoretically, provide the students with an impetus to complete their educations.

"Three groups of students are presently being selected for the pilot program," Hoffman said. "One of the groups will be comprised of students with special aptitudes, a second group will contain students with normal intelligence, and a third, the control group, will receive no training but will be studied as part of the overall program."

Based on his experience with the California Museum of Science and Industry, which co-sponsored a children's computer workshop with SDS last summer, Hoffman said, "I am confident that among the students who attend our classes the dropout rate will be reduced by 50% or more."



Moving Finger Writes

In this experimental Sylvania system, hand printed characters, written with an electronic ballpoint pen on an electronic tablet, are read by the computer. The display permits visual verification that the system had interpreted the characters accurately.

Polvino Heads Digitronics Users Association

Special to Computerworld

NEW ORLEANS, La. — Charles Polvino of American Cyanamid Co. has been elected president of the Digitronics Users Association.

Other new officers include M. Jeffrey Burch, vice president; William Noyovitz, treasurer; and Morton Siegelbaum, secretary.

Burch and Siegelbaum were re-elected.

The association also voted to continue allowing nonusers of Digitronics equipment to attend seminars held by the association.

The association is comprised of users of Digitronics data acquisition and communications equipment.

Computers Lost Face in the Elections

(Continued from Page 7)

them would be exposed by the delay, he contended.

But Phyllis Huggins, a computer industry commentator, noted that the industry, particularly IBM, would like to see write-in votes eliminated because of the problem of tabulating them by computer. This, coupled with a request that key counties be allowed to report earlier, would "lose our democracy," she quoted a poll inspector as saying.

8) Industry Ethics

A battle over the ethics of the Association for Computing Machinery broke out last summer when the ACM, during the IFIP conference, was accused of unethical practices relating to advertising in the ACM's own publications. ACM Executive Director J.D. Madden replied that the ACM was holding in abeyance all questions relating to ethics.

Questions were then raised as to whether the ethical guidelines, adopted for ACM members sometime ago, applied to the ACM and its employees. Next the ACM announced it would not arbitrate ethical disputes between its members.

The whole question of ethics may come up at the next ACM Council meeting as a result of

discussions at the council meeting last month.

At present, it is not certain whether the ACM has a right to promulgate industry ethics. The organization may be a trade association as well as professional society. This would restrict it from any action in the area of ethics.

9) Computer Warranties

The degree to which a manufacturer is actually obligated to stand behind its claims was brought into focus last year.

In April a U.S. District Court found IBM liable for damages for breach of warranty during the settlement of the Food Center Wholesale Grocers, Inc. suit. This was the first such case that IBM had lost.

The main issue in this case was the court decision that the original tabulating equipment contract had actually been altered by later written and verbal discussions between the customer and IBM.

Then later in the year, as mentioned above, the Defense Department and the GSA informed computer manufacturers that they would be considered responsible for any and all statements and claims provided to procurement officials in conjunction with a procurement,

whether or not such information was contained in the purchase order.

The trend toward forcing the manufacturers to live up to statements made by their salesmen and representatives may be the source of future legal actions against the manufacturers, as well as a means of protecting the user from being misled.

10) The Mini-Computer

Last fall the industry was both amused and startled to hear the announcement of the new mini-computer from Viatron. It seems likely that the first emotion to disappear will be the amusement.

The system is for real. It works, if only in prototype. The system is a hard-wired program system, with only one program available at present. The system includes magnetic tape, video displays, a printing robot, and a keyboard device for data entry.

The system is almost ridiculously cheap (about \$39 per month for a normal configuration) and could put the Ma and Pa grocery on-line for less than it currently spends on bookkeeping.

The systems still are scheduled for delivery next summer, and Viatron reports it is having no current problems with manufacturing arrangements.

Push Button Lock Simplifies Security

NEW YORK — A new security lock for computer rooms and restricted areas is available.

The lock, called the Simplex, combines the features of combination locks with the ease of operation of pushbutton locks. The lock can be installed in doors, files, cabinets, and any other storage device with drawers or doors, according to the manufacturer, Simplex Lock Co.

The lock has been tested by companies across the country and has been approved, accord-



ing to the company, for use in Department of Defense closed or restricted areas for plants engaged in classified projects.

Tape cabinets, record cabinets, and other types of storage equipment are available with the new lock already installed. The combination can be changed as often as necessary for security, and can be opened very easily if the combination is known.

Combination possibilities include the use of more than one button simultaneously, as well as in sequence. From one to five buttons can be used for the combination. The lock lists for \$30. Simplex Lock Co., 150 Broadway, New York, N.Y. 10038.

Power System Monitor

A new power system monitor protects computers and EDP equipment from undetected power line fluctuation. It per-

New Products

ceives deviations from the specified computer requirements and provides audible and visual warn-



ing signals. A clock on the face of the monitor stops at the time of a malfunction and the event is permanently recorded on a four channel strip chart. Four models are available. Airoyal Manufacturing Co., 117 Harrison Ave., Roseland, N.Y. 07068.

Graphic Terminal

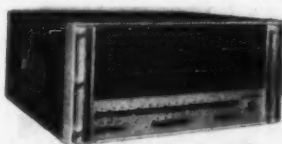
A new self-contained, desk top graphic terminal provides com-



plex graphics capability through use of a solid state data entry keyboard and visual displays. All elements required to communicate with a computer are housed within the T4002 console. System components are: display unit, terminal control, character generator, keyboard, and input/output interface. The screen is 6-1/2" by 8-3/4" and will accommodate up to 35 lines of alphanumeric characters with 80 symbols per line. Manual entry of data is through a solid state keyboard with full USASCII capability. Tektronix, Inc., P.O. Box 500, Beaverton, Ore. 97005.

Small Computer

A new digital computer, the DataMate 16, has a 4096 word, 1.0 microsecond memory expandable to 32,724 words. Byte,

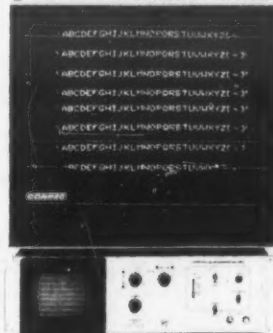


word, and double word processing capability with multilevel indirect addressing are included. Standard peripherals are a Teletype, paper tape reader and punch, incremental magnetic tape, IBM compatible magnetic tape system, digital plotter, line printer, and rotating mass storage. A plug-in card is used to interface. The unit can be desk top or rack mounted. Price: \$13,900. DataMate Computer Systems, Big Springs, Texas.

Scan Converter

A new scan converter unit, Type 4501, converts informa-

tion written on a 5" storage display tube to composite video or modulated RF for viewing on large screen television monitors



or receivers. The unit may be operated in a Store or Nonstore mode. Typical applications are computer graphics, remote data communications terminal, education, and training. Priced at \$2200, the scan converter comes in cabinet or rackmount. Tektronix Inc., P.O. Box 500, Beaverton, Ore. 97005.

Data Set

A new data set, Modem 4400/48AE, automatically equalizes dial-up phone lines for high speed data transmission and automatically equalizes to the transmission line. An indicator shows when a line is not suitable for data use. International Communications Corp., 7620 N.W. 36th Ave., Miami, Fla. 33147.

Input/Output System

A new input/output system, the Univac 1100 IOS, priced from \$185,000, has a main memory of 36 bit words and is designed for use with 1108 systems to service on-site peripheral equipment and remote terminals. Such functions as communications handling, card reading, card punching, and line printing are transferred to the IOS. Hardware tabling of communication interrupts and buffer chaining are included. Delivery will begin in late 1969. Sperry Rand Corp., Univac Div., P.O. Box 8100, Philadelphia, Pa. 19101.

Calculator

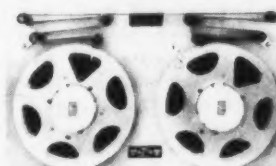
A new electronic printing calculator, the Logos 328 priced at



\$1595, has built-in programs for solving percentages, square roots, and raising to powers, as well as the basic arithmetic functions. Six registers can be used interchangeably and three of the six are independently addressed from the keyboard. The unit will handle decimals from 0 to 15 places. Decimals are entered into the machine as they are read from the problem and answers print to the number of places selected and are rounded off if desired. Olivetti Underwood Corp., 1 Park Ave., New York, N.Y. 10016.

Tape Spooler

A high speed tape spooler for use in numerical control and data processing applications contains a servo mechanized tape



tension system for trouble free handling of tape. A high speed rewind facility permits tape to be rewound at speeds of up to 180 ips in either direction. The unit is equipped with 8 inch NAB reels. Servo arms can be latched at the outer extremity to facilitate tape loading. Ferranti-Packard Electric Ltd., Electronics Div., Toronto 15, Ontario.

Wats Line Monitor

A device for measuring the amount of time used on Wats (Wide Area Telephone Service) lines is now available. The new unit, called the Watsline Moni-



tor, provides information on the number of calls made over each monitored line, and the total number of hours used on the line. The unit can be used to assess the effectiveness of patterned or unlimited installations, as well as a warning device for overtime rates. The unit sells for \$495 and carries a one year guarantee. Monitor Business Machines, Inc., Freeport, L.I., N.Y. 11520.

Analog/Hybrid Interface

A standard analog/hybrid interface has been developed to interface Electronic Associates' 580 desk top analog/hybrid computer to Digital Equipment Corp.'s PDP-8. The new interface offers a low cost use of hybrid computation power for training and for development of hybrid operating programs. There is also a related software package to facilitate the interface design. The software includes a full set of hybrid subroutines, allows the user on-line control of the 580 for setup and checkout from the PDP-8 keyboard, and the ability to use the full set of diagnostics through the interface. Electronics Associates, 185 Monmouth Parkway, West Long Branch, N.J. 07764.

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A \$1 Billion 'Gift' Goes Begging

By L. Richard Caveney
Director, Government Marketing
Bryant Computer Products

I have one billion dollars, which the federal government refuses to accept. We now have a 10% surtax on individual income and Congress required a \$6 billion cut from federal programs as part of the surcharge act.

The present cutting approach applies restrictions across the board without regard for inefficiencies and waste. It is these latter problems which require an urgent call for understanding by the public.

The greatest "economy" is to be exacted from this country's research and development activities which account for about half the controllable part of the budget. R&D was reduced \$563 million in the President's 1969 budget — a whopping 35%. The cuts came not only from space and research facilities but from medical colleges at a time our nation faces a critical shortage of physicians. How can this type of retrenchment be called "economical"? Present cuts also will diminish the ranks of future scientists and engineers.

What has a conservative businessman to worry about? Plenty! When basic research dries up, so does the source of new applied technology.

The cuts should be accompanied by the efficient management of existing men, money, and materials coupled with the rapid implementation of new ideas from within and without the federal establishment. The cuts also should be accom-



R. Caveney

panied by a sharp reappraisal of procurement procedures.

Procurement realities, which imbue profit oriented organizations, have little force within the federal establishment. "Cost-effectiveness" is a dirty word, not a rigorous, penetrating method for effectively allocating resources. The problems in technical procurements are especially acute. In a day when an engineering education's relevance to burgeoning technology means far less than a decade ago, we have many government "managers" making decisions on major equipment procurements whose latest knowledge, and in some cases training, predate World War II. In the accelerated technology of today, the instrumentation of 20 years ago is useless: computers have only come into currency within the last 15 years; lasers, solid state physics, communications satellites, and instantaneous TV replays are examples of the changes that the immediate past has wrought. Can they evaluate engineering differences, or the complex inter-relationships that exist between existing equipment and the proposed purchases? Or do they simply say,

"I'll take that one," because they recognize a familiar manufacturer's name?

Congress the Watchdog

This problem is compounded by the fact that although Congress will not appropriate funds without providing for supervision of their disbursements, the individual member of Congress has come to feel insecure in his own technical knowledge and hesitates to "take on" a lineup of agency "experts," particularly in public session. Congressional committee staffers, in general, are not technically trained either and wonder about the conflicting expert "advice" they receive — frequently unsolicited.

The result is purchasing anarchy, sometimes referred to as the right of "free choice." The agencies have, for all practical purposes, complete, unsupervised control of any purchases for any program, no matter how technical.

Establishment's Position

As modern science produces a revolutionary environment, which is part and parcel of the haunting problems that beset the people of this nation, the bureaucratic position remains: there must be no outside review or control over the procurement practices of the federal government, and there must be no "third-party intervention" by any board or panel or expert on matters of federal policy regardless of how many lives and resources of any sorts are involved and wasted. In short, all effective power must be reserved to "Big Brother," the federal establishment.

The starkly etched needs of our domestic society are being sacrificed to the emotional need of the upper echelons of government managers to be comfortable, because, as a presidential spokesman has written, to change "would require complete revision of our present concepts of . . . procurement."

Suggestion System

In an era of instant change, some federal employees hope to modify or alter the winds of federal procedures through the Federal Employee Suggestion Program.

But there is no rebuttal if a suggestion is rejected. Letters of disapproval in my possession show a complete disregard for submitted facts and in general are non-responsive to the suggestion's specifics.

For example, one of the government's largest computer users turned down an extraordinarily detailed and documented million dollar suggestion regarding a newly marketed computer tape drive with the comment, "We had already witnessed a demonstration of the tape unit of which you informed us. . . ." There was no refutation of the cost figures which showed a 33-1/2% increase in efficiency with a decrease of 29.7% in cost; in fact, no reference was made to any of the cost-effective specifics.

The Congress has an interest in the maximum utilization of appropriated funds. A staff member of the House Committee on Post Office and Civil Service said they "frequently" had government employees call regarding rejected suggestions, but they could do very little as they had no personnel or funds for the purpose of evaluating rejected suggestions. He forwarded a copy of their May 16, 1968 report covering "examples of improved management reported by the 26 largest departments and agencies in the federal government."

"Cost Cutting Tips"

One of the cost cutting tips, made by the General Services Administration, was as follows: Save on use of the character "O" on typewriters. In many instances this character is now imposed by typing the letter "O", backspacing and then adding the diagonal slash "/". These three

But Caveney Sees Progress

As 1968 closed, L. Richard Caveney, one of the loudest critics of federal procurement practices, said he believed the fight for changes finally is succeeding.

"Since I testified before Congress in 1967, I have noticed an increased understanding of the peripheral manufacturer's problems," he said.

The Air Force's "live demonstration" requirement for nontactical computer systems has been put in a more realistic time frame, he said, and the complete elimination of the requirement is foreseen in the not too distant future.

The Peripheral Manufacturer's Association, which held a pre-organization meeting at the Fall Joint Computer Conference last month, should be formally organized in 1969. This, he said, will give more than 60 manufacturers a unified voice which will have more impact on legislation and on the Executive Branch. And, he said, the new Republican administration hopefully will have a much more friendly attitude toward business problems and be more opposed to waste.

steps are time consuming in instances where usage of the character is very frequent. The GSA has arranged that any standard typewriter can be ordered to include the character at a \$3 increase in cost.

While savings of this value were filtering about the GSA, through congressional committee to publication and distribution, several valid suggestions on ADP (valued by outside experts as bordering on a one billion dollar a year saving) are either turned down due to incompetent review or are not responded to at all. Manufacturers of computer peripheral equipment, such as magnetic tape transports, are attempting to get on GSA schedules (license to sell to the U.S. Government) and thus create price competition. To state it another way, GSA is just another ridiculous obstacle placed in the procurement cycle. And yet the federal government loses the ability to reapportion its resources toward its domestic tasks.

Air Force Savings

On page 6 of the publication the Air Force proudly proclaims its "standardization of Air Force base level automation" with projected six year "savings" of \$17,550,000 beginning in 1969. The Air Force hopes to accomplish this "with a standard electronic data processing equipment (EDPE) configuration." It does not mention that the Phase II contract initially let by the Air Force to IBM had to be renegotiated after the uproar by major computer corporations and other groups, resulting in savings to the government of approximately \$50 million. The renegotiated winner will supply a minimum of about 130 computer systems, with each computer system having two or three \$200,000 large capacity memory storage units.

The report also does not mention that testimony given to the Congress in November, 1967, proved that for one typical \$900,000 government owned computer configuration, the use of independent manufacturers' peripheral devices would have reduced the purchase cost by about \$400,000. That is a 44% cost avoidance at the outset which, extended over the Air Force's 130 EDPE minimal basic configurations, could total at least another \$40 million in savings. Additional savings in floor space, spare parts, maintenance time, and manpower would have added substantially to these savings. Such savings would buy a tremendous amount of "system responsibility."

Since that testimony was published, no changes have been made in that procurement nor has any GSA procurement been let in which a fair amount of independent peripheral manufacturers' products are bid as individual units.

An April 25, 1968 Bureau of the Budget letter explains: "To provide for direct bidding of magnetic tape units, or other computer system components, as separate pieces of equipment in all procurements would require complete revision of our

present concept of EDP systems and procurement."

The Facts Be Damned

In other words, although expert written testimony has been given to a congressional committee, the problem is just too big to contemplate, and please be gentlemen enough not to bring it up again because we in the Budget Bureau are too busy trying to cut \$6 billion from needed programs to think of modifying our procedures to effect savings by cost avoidance.

Nor does the Air Force mention the fact that the Phase II contract may put a second computer at most Air Force bases. My understanding is that the existing Phase I Univac 1050s now handling supply activities will not be compatible with the Burroughs computers being acquired and so cannot act as backup units. Nor can they share the Phase II personnel and financial activities. Is the ground being laid for the integration of Phase I and II somewhere in the Pentagon at this moment?

According to the GSA, the Pentagon lost \$160 million dollars by acquiring new computer equipment even as computers it already owned or leased stood idle. This idle computer time amounted to an additional loss of \$250 million dollars. Not a bad loss — only \$410 million. If government were rated by how much it wasted in tax dollars it would be the most efficient government in the world.

President Harry S. Truman stated when he signed into law H.R. 1366, which granted unprecedented freedom to the Executive Branch from specific procurement restrictions during peacetime, that this bill had a hidden danger and that responsibility upon the Executive Branch, which includes the Defense Establishment, had been increased. The danger, he said, is that the natural desire for flexibility and speed in procurement will lead to excessive placement of contracts by negotiation and undue reliance upon large concerns. This, he said, must not occur. It has. In a sense, this law gives government a license to practice collusion and, if not collusion, stupidity at the taxpayer's expense.

Did President Truman have the foresight to put forth the first warning concerning the huge military-industrial complex which has been forged and nurtured by the misused procurement law, H.R. 1366? About 1960, former President Dwight D. Eisenhower also warned the American people of such a merger. All the technological procurement waste of the taxpayer's dollar and the lack of efficient management in government seems to support the fact that both former presidents were right. Congress should act expeditiously to place the proper controls over the Executive Branch in order to provide for the proper funding for all programs and decrease the possibility of any such future fiscal crisis.

(Continued on Page 11)

COMPUTERWORLD

SPECIAL SECTION

Section 2

January 1-8, 1969

Page 1A

CDC-IBM Suit Involves Many Issues

Share, PL/I, Maintenance, IBM Salesman,
Customer Employees Are All Mentioned

The Control Data complaint against IBM may well involve millions, perhaps even a billion dollars. However, this contest between the giants has many-sided issues which directly concern parts of the computer community. There are references to the IBM quota system, to customer employees, to computer languages, etc. These are brought out, together with some background, in the stories on the next two pages. In the pages following we are reprinting the original complaint as well as IBM's reply. In the individual stories, references to particular sections of the complaint are keyed in accordingly.

PL/I Development Discriminatory?

Joint Ventures by IBM And Customers Cited

In the complaint, Control Data claims that IBM has formed joint ventures with its customers and customer groups on a discriminatory basis, and has used its predominant position in such a way as to deny Control Data participation in these computer language developments, or even access to their achievements.

The entry, in paragraph 23 of the complaint, subsection M, page 8, appears to be a straight reference to the development of PL/I. PL/I started off as a committee set up by one of the IBM user groups, Share, which was interested in finding a successor to Fortran. Originally the name of the language being developed at the time was, indeed, Fortran VI.

After the first announcement of the System 360, which included a mysterious reference to "NPL," the committee was expanded and at one time included members from non-IBM computer firms. These were later dropped and the effort became purely one made up of IBM, Share, and Guide groups.

Subsequently, although there were manuals printed about the language, the specification changed constantly and this caused problems, even within IBM. The DOS PL/I, for instance, was built around the third edition of the PL/I specification manual, even though it was not ready until the fifth edition had been published. Later, restrictions were placed on the language specification manuals by IBM.

Recently some members of Share came to the opinion that IBM did have what they considered to be undue influence in the group's activities and, in a minority report on the alternatives to the Share/Guide merger, recommended a number of ways to modify this influence. In general, they suggested a reduction in the size of the organization to a more manageable structure rather than to increase the size as was being proposed by the executive committee which favored the Share/Guide merger.

Another point in the complaint is that joint ventures have been formed with customers as well as with customer groups. Although there is no allegation of conspiracy, this could cause ramifications because many IBM customers are large

enough to invite problems of antitrust in their own organizations.

Originally, a number of firms, such as General Electric, which were both computer manufacturers and users of IBM equipment, were very specific about the openness of the Share activities. However, recently Share has moved to restrict the distribution of much of its material through the use of copyright, and through restricting the distribution of copies of their meeting proceedings.



The console of the CDC 6600. Control Data contends that IBM actions damaged the market for this machine when it was first introduced by announcing the IBM 360/91.

Master Contracts And Their Effects

On page 10 of the complaint (22cc), there is reference to the use of master contracts for many customers. The complaint alleges that the use of such contracts lacks written particulars concerning the terms, specifications, prices, or manpower commitments made by the defendant, IBM, for a customer's subsequent computer procurements.

One illustration of these contracts was disclosed earlier this year in an action between Food Center Wholesale Grocers, Inc., (the plaintiff) and IBM. The food center had ordered a RMAC system in 1962. There were problems in the operation of the 305 RMAC and the question of what constituted the contract between the two parties was argued in court.

The food center claimed that the contract, or agreement, between the parties was not embodied in any one document, conversation, or action, but was created as a result of many meetings and conversations. It said the actions of the parties were to be used to define the contract rather than scanty and incomplete documentation.

The plaintiff said that the terms of the contract included an agreement on the part of the food center to lease the RMAC from IBM for use in the food center's operation of its wholesale grocery warehouse. RMAC "was to perform certain accounting, administra-

tive, and record keeping functions electronically."

In its answer, IBM denied generally those allegations. In particular that denial covered the allegations that the agreement if any between the parties was entered into in or about September, 1962. The defendant takes the position that the primary contract between the parties was entered into September 20, 1954, in writing, a copy of which is attached to the answer and marked "A". One of the terms of that 1954 contract states as follows: "machines and devices, in addition to the above, or to replace any you may have in use, will be furnished to you under this agreement at the schedule of charges in effect on the date such machines or devices are installed ready and for your use."

Pursuant to that 1954 agreement, IBM received on or about May 28, 1962 a purchase order from Food Center in which Food Center ordered from the defendant a 305 RMAC. That order was accepted sometime during the summer. Subsequently, IBM tried to meet and eventually did meet the date requested by Food Center for delivery and installation of the machine. Pursuant to the terms of the general 1954 contract, IBM agreed to furnish "its electric accounting machine service comprising the use of its machines and devices listed below, instruction in the operation of the machines, and machine maintenance service," (emphasis added) upon the terms and conditions set forth in the remainder of the contract.

ARGUMENT

It is the defendant's contention that the contractual relations between the parties are governed by the 1954 contract pursuant to which various machines were ordered by the plaintiff over a period of years. The machine in question was ordered by the plaintiff on or about May 28, 1962. By the terms of the 1954 agreement plaintiff had a right to supplement or replace its original group of machines which were listed in the 1954 contract. The basic obligation of IBM, however, did not change, namely "to furnish its electronic accounting machine service comprising the use of its machines and devices listed below, instruction in the operation of machines, and machine maintenance service." The obligation of the plaintiff to pay rental for the machines was fixed by the 1954 contract. IBM's obligations were defined and stated by the 1954 contract and consisted of an undertaking to supply the requested machines, to maintain them and to instruct the customer in their operation and use. It is IBM's contention that it was never part of its contractual obligation to program the RMAC for the use of the plaintiff.

The contract does include a phrase which indicates that the machine supplied should be in accordance with IBM's published specifications. However, it is not clear what this actually comprises.

In this particular case, the jury gave a decision of breach of warranty and negligence by IBM, in favor of Food Center — but dismissed Food Center's claim for breach of contract.

Software Lock-In Cited as Hindrance

On page 8, under K2, a lock-in involved in the use of single prices for hardware and software is claimed to have hindered the development of independent software companies. Software has become so important that a machine can really be said to be unusable unless the software is available. There have been individual

statements by IBMers that the cost of software to a customer could be calculated to be only about 2% of the cost of the computer and that not providing it would not lead to many economies.

The actual cost of software development is not really known. Two years ago, in talking to a Share meeting, Thomas J.

Watson, Jr., chairman of IBM, revealed that IBM had badly underestimated the cost of 360 software and commented that he had asked two IBM executives just what it had been. The first said \$40 million, and the second said \$50 million.

The Association of Independent Software Companies, in a position paper dated Nov. 22, gave a definition of the problem which ran like this:

Let's take a hypothetical example: Software Manufacturer "A" decides he can build a Cobol compiler for the 360 that will be 25% more efficient. "A" proceeds to build this product which employs some inventive concepts and expends one million dollars. The product performs as originally estimated. "A" advertises in the trade publications that it offers a Cobol compiler which is 25% more efficient than IBM's for only \$5000. "A" distributes literature and user manuals to prospective clients and runs demonstrations. He even installs a few systems. However, as word gets out

about this new system, the users put pressure on IBM to produce an improved system. IBM "reluctantly" agrees to do this. In building the new version some of "A"'s principles are employed which were disclosed in the promotion of "A"'s product. Since patent protection was not available to "A", he has no legal position to protect his investment in the inventive concepts that he developed. "A" lost a lot of money.

You may say that can't happen but a very close parallel to the situation described above happened with Digitek and a Fortran Compiler. It happened to ADR with a system called ESL. It will continue to happen when the economics of the situation or the customer pressure require it. Software companies cannot base the existence of their business on the philanthropy of the computer manufacturers.

It is interesting to note that the software companies felt that separate pricing of hardware and software did not solve the problems.

Sales Quotas Are Called Too Restrictive by CDC

The size of salesmen's quotas is generally an internal matter in a company, but in its complaint Control Data has also featured IBM's sales quotas.

The IBM quota system is described as so restrictive as to coerce its employees (see 23P, page 9 of the complaint). The reference appears to be to IBM's rather unusual quota system. This is, like most systems, based on points, credits, and debits. However, unlike many sales compensation plans where a salesman is debited quota points only if a customer fails to take ordered equipment, or discontinues use of the equipment, the IBM quota system is based on a 100% debit on the value of any equipment discontinued, even if new equipment replaces it.

The quota arrangements cover three pages of IBM's data processing sales compensation plan. They are quite complicated, and some IBM teams keep one person as an in-house "adviser" on the best time to place orders so as to obtain the maximum commission. Essentially, however, the result of the quota arrangements is that a sales representative's

commission can be hurt very substantially if any of the accounts in his area discontinues use of IBM equipment without purchasing or renting more expensive equipment from IBM. This is true no matter how long the equipment being replaced has been in use.

In its response to Control Data, IBM mentions the large reduction in the cost of processing, which, it says, has decreased to 1/40 of what it was a few years ago. However, there are normally no arrangements made to reflect this fact in working out quota debits on older equipment that is being replaced.

There are a number of ways in which a branch manager can effectively eliminate some of the worst effects of having experimental equipment in his area. By assigning particular representatives to accounts where quota sales performance is not part of the salary structure, it is often possible to clear out a number of installations (which would otherwise provide problems) without impacting the representative concerned.

Breach of Consent Decree Seen In IBM Time Sharing Service

In 1952 the United States filed a civil action claiming that IBM, which then owned approximately 90% of all tabulating systems in the United States, had violated the Sherman Act by monopolizing and attempting to monopolize interstate and foreign trade. After four years the litigation culminated, in 1956, in a consent decree through which IBM agreed in effect not to engage in the service bureau business except as a separate corporation.

In the Control Data complaint, page 10, reference is made to this decree and it is claimed that the recent entry of IBM into the time sharing business was in breach of this decree. IBM originally started its time sharing operation (Call/360 Basic, etc.) under its data centers but two months ago moved them to the Service Bureau Corp. It was believed at that time that this move had occurred because of the pressure put upon the corporation by people like Joan Van Horn of VIP Systems.

The key portion of the 1956 decree appears to be the definition of a service bureau business. This is defined in the decree as being "the preparation with tabulating and/or electronic data processing machines of accounting, statistical, and mathematical information and reports and others on a fee basis." IBM argues that the provision of a time sharing facility allows a user to prepare his own reports without the intervention of any service bureau personnel and so is not, in fact, a service bureau operation.

Now Over?

In this area the Control Data complaint makes no reference to CDC's feelings on a breach of the decree or whether the behavior complained of has now actually ceased.

One point has been brought out which

may affect this (also on page 10) where the complaint refers to the alleged joint marketing efforts between IBM and the Service Bureau Corp. which, the complaint says, has been used as a vehicle to lock customers in and to grant discriminatory price concessions. No direct joining of these two operations is mentioned in the complaint.

How the Sherman Act Describes Antitrust Violations

Section 2 of the Sherman Antitrust Act provides:

"Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade of commerce among the several States, or with foreign nations, shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished by fine not exceeding fifty thousand dollars, or by imprisonment not exceeding one year, or by both said punishments, in the discretion of the court."

This is the section most relied on in the Control Data complaint. The act does not say that a monopoly is prohibited, but says that "to monopolize" is to transgress the law. The word "monopolize" is broad and not defined in the act. The problem before the court will be one of statutory law. Any economic, social, and political philosophies will be only marginally relevant.

There are three potential offenses in Section 2 — to monopolize, to attempt to monopolize, and to combine or conspire with others to monopolize.

While it is only somewhat difficult to define what is needed to have a monopoly, the phrase "to attempt to monopolize" is much harder to define.

The basis comes from common law, which existed before the Sherman Antitrust Act, and relates to any attempt to restrain trade, an action considered to be both unwelcome and also an inevitable result of a monopolization.

Different Companies, Different Rates

As a result, many actions which a company can perform quite legally cannot be taken by a firm capable through these acts of effectively forming a monopoly. A businessman, reading through some of the complaints, might well feel that some of the conduct complained of is normal good business practice. For instance, fighting for an order, even when he has heard that the order has gone to a competitor; obtaining patents and patent rights; using "letters of intent" to encourage a customer to place a firm order later. These appear to be, and often are, ordinary business practices. He is quite correct — but this may be irrelevant.

Under the law, it is possible that these same actions, when taken by giant companies, may be found to be a serious "attempt to monopolize," and therefore be forbidden under the act.

Foreign Commerce

One point of the law is that it applies to interstate commerce as well as foreign

commerce. The federal government has the power to regulate trade with other countries and on occasion has done so. The aim of this regulation is to provide other American companies with access to foreign markets rather than to spread the protection of United States law to foreign competitors. So much is this so that if the foreign competition falls into a cartel type operation, specific exemptions have been granted for American firms to do likewise, despite the Sherman Act.

The Control Data systems have sold fairly well around the world. Even so, there are many areas where IBM through its world trade organization has almost complete control. The Near East oil refineries probably constitute one such area.

The effects of any change ordered in the policy of IBM in foreign countries presumably would be aimed in the first place at securing larger shares for such companies as General Electric in France, Honeywell in Scotland, etc. However, it is possible that the foreign governments would insist in equivalent privileges being given their own computer companies. The overall impact of this case might then well be to extend some protection to non-American manufacturers, even though the Sherman Antitrust Act is simply designed to protect American companies.



Control Data's new 7600, the largest, fastest computer in the world, is CDC's latest bid to capture more of the large scale computer market.

Text of Control Data Complaint

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IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF MINNESOTA
THIRD DIVISION

CONTROL DATA CORPORATION,
Plaintiff,

vs.

INTERNATIONAL BUSINESS MACHINES
CORPORATION,
Defendant.

Civil Action No.: 348-312

Filed: Dec. 11, 1968

COMPLAINT

Plaintiff, Control Data Corporation, brings this action against Defendant, International Business Machines Corporation, and complains and alleges as follows:

I.

JURISDICTION AND VENUE

1. This Complaint is filed and this action is instituted under Sections 4 and 16 of the Clayton Act (15 U.S.C. Sections 15 and 26), and pursuant to 28 U.S.C. Section 1337, in order to recover damages for past violations and to obtain injunctive relief against continuing violations of Section 2 of the Sherman Act (15 U.S.C. Section 2).

2. Defendant International Business Machines Corporation (hereinafter "Defendant IBM") maintains offices, transacts business and is found within the District of Minnesota.

II.

PARTIES

3. Plaintiff is a corporation organized under the laws of the State of Delaware with its principal place of business and administrative headquarters in Bloomington, Minnesota. It is the assignee of and successor in interest to Control Data Corporation, a Minnesota corporation organized in 1957. Plaintiff is engaged in the development, design, manufacture and marketing of computers, related peripheral equipment, supplies and services in competition with Defendant IBM. Plaintiff maintains manufacturing, research, and sales facilities throughout the United States and in a number of foreign countries.

4. Defendant IBM is a corporation organized under the laws of the State of New York and is engaged in the development, design, manufacture, and marketing of computers, related peripheral equipment, supplies and services. Defendant IBM maintains manufacturing and research facilities at numerous locations throughout the United States and abroad, and markets its products and related services from well over 1,000 offices located in the United States and in at least 105 foreign countries.

III.

DEFINITIONS

5. As used in this Complaint, unless otherwise indicated or qualified:

(a) "Computer" means a general purpose stored program digital computer system which is an electronic device designed to solve many types of data processing or computational problems, the exact nature of which problems may have been unknown at the time of its design; in solving such problems, all quantities and variables

of data are represented by alphanumeric characters which are expressed as discrete or discontinuous electrical impulses and transferred into and stored in the device together with one or more programs or sets of instructions, also represented by electrical impulses, which internally stored programs direct or cause the performance of sequences of arithmetic and logical operations with respect to the data as well as such internally stored programs. "Computer" includes input and output devices and their control units; storage, arithmetic, control and logical units; and associated basic software.

(b) "Peripheral equipment" means those units of a computer, as above defined, consisting of such equipment as input or output and external information storage devices.

(c) "Tabulating equipment" means machines and devices used for entering, converting, receiving, classifying, computing, and recording data by means of punched paper or tabulating cards. Tabulating machines and devices may be electrically connected to computers (in which case, they are included within the definitions of "computer" and "peripheral equipment"), or an interconnected group or grouping of such machines and devices may perform their task mechanically or electro-mechanically entirely independent of a computer, generally controlled by means of externally wired programs (in which event they are referred to as "tabulating systems").

(d) "Hardware" means the mechanical, magnetic, electrical and electronic devices and other tangible components of a computer, including peripheral equipment, as contrasted with software or programs.

(e) "Programs" or "software" are routines or sets of instructions which control the operation of the hardware. Programs or software can be of several types, including operating system programs, compiler and assembler programs, and applications programs. "Operating system programs" are programs controlling such elements of the fundamental operation of the computer as flow of jobs and data within the computer. "Compiler and assembler programs" are programs which translate higher level languages and special codes to a form acceptable to the computer. "Applications programs" are programs developed to perform certain predetermined computations for specific jobs or problems and usually function in conjunction with an underlying operating system program.

(f) "Compatibility" or "compatible" means that one model or class of computer will translate, execute and process instructions or data which another model or class of computer also translates, executes, and processes without significant conversion or modification of the instructions, data or either computer.

(g) "Computer markets" or "interstate and foreign computer markets" means each and every one of the three markets defined in Paragraph 17, and "submarkets" means each and every one of the submarkets within each of said three markets, as identified in Paragraph 18.

IV.

TRADE AND COMMERCE

History of the Industry.

6. Defendant IBM has manufactured and marketed the vast majority of the world's computers. A large part of the computer industry built upon and is the successor to the tabulating system industry, having substantially displaced the tabulating system industry due to the far greater capabilities of computers. Computers are capable of processing immense quantities of data and solving extremely complex problems at speeds measured in millionths and billions of a second. By contrast, tabulating systems were suitable only for the relatively slow and routine tabulating of information, although tabulating equipment continues to be used both by itself and in conjunction with computers.

7. In 1952, Defendant IBM owned approximately 90 per cent of all tabulating systems in use in the United States. In that year, the United States of America filed a civil action alleging that Defendant IBM had violated and was in violation of Sections 1 and 2 of the Sherman Act in that it had monopolized, attempted to monopolize and was then monopolizing interstate and foreign trade and commerce in the tabulating industry and had entered into contracts, agreements and understandings in unreasonable restraint of interstate and foreign trade and commerce in tabulating equipment and tabulating cards.

8. This litigation culminated in 1956 with the entry of a Final Judgment by consent of the parties which Judgment included requirements, among others, that Defendant IBM offer customers an opportunity to purchase as well as lease tabulating systems and computers, cease engaging in the service bureau business except through a separate corporation (subsequently, its subsidiary, The Service Bureau Corporation), and grant nonexclusive licenses under its existing and future patents relating to computers and tabulating systems.

Text of IBM Reply to CDC Charges

Text of IBM Reply

ARMONK, N.Y., DEC. 12... International Business Machines Corporation said today that it has had an opportunity to review the antitrust complaint filed against it yesterday by its spectacularly successful competitor, Control Data Corporation. The allegations made by Control Data, IBM believes, are unfounded, and IBM stated that it will vigorously defend itself against this action.

Preliminary study of the complaint indicates that Control Data appears to make two mutually inconsistent, and equally baseless, assertions:

- that the data processing industry is not competitive;
- that there has been excessive competition which has been contrary to the public interest and unfair to Control Data.

It is IBM's view that the data processing industry is highly competitive. IBM's major competitors are among this country's most powerful and capable companies and they uniformly have indicated that they regard data processing as an exceptional growth opportunity. In addition to Control Data, the industry includes companies such as General Electric, RCA, Honeywell, Sperry Rand, NCR, and Burroughs. In less than two decades the industry has grown to the point that there are now scores of companies manufacturing central processing units; as many more are producing peripheral equipment used with computers; and hundreds of programming and systems support firms and service bureaus have entered the industry.

CDC's own success, since it was founded in 1957, proves that a company need not be powerful to enter the data processing industry and succeed. Starting with less than \$1 million in capital, Control Data's assets have grown to more than \$465 million. Its sales for 1968 were more than 25 times its sales ten years earlier, and rose by more than 42 per cent between 1967 and 1968 alone. Control Data complains particularly about IBM's



An IBM 360/91 installation. Control Data contends that IBM rushed announcement of this system after CDC announced its 6600, thus reducing CDC's potential market.

announcement of its System/360 early in 1964 yet by 1968 (fiscal year ending June 30), Control Data's net earnings were more than 11 times its net earnings in the year preceding the System/360 announcement.

Control Data's second claim is that there has been too much competition. But the natural result of this competition has been lower prices and better machines. Technological innovation stemming from such competition has meant, for data processing users, that over a 15-year period computers increased in speed 150-fold and the cost of an individual computation was reduced to a 40th or less of its previous level.

Control Data's own past statements are inconsistent with its present claim that competition from IBM damaged Control Data. In June, 1964, two months after the announcement of IBM's System/360, CDC claimed a "record volume of new orders." More recently, Control Data's 1968 annual report stated, "We are entering the new year with a business backlog which shows a healthy increase over what it was a year ago," and, "The

cumulative value of installed 6000 series computers increased over 60 per cent during the year. This is a much greater growth rate than that of the overall computer market."

Addressing a group of security analysts in October, 1968—less than two months ago—Control Data's chief executive officer said the areas of the computer market growing most rapidly "are those of very large computer systems, peripheral equipment and terminals." He went on to say of these fast-growing market areas, "Our well-established worldwide leadership in very large computers, with our present 6000 series of super computers, of course, gives us a commanding position today in the fastest growing area of the market." He said Control Data "is also in a strong position" in the areas of remote access computing and peripheral equipment.

Both IBM and CDC have had great success in the expanding, changing data processing industry, with CDC growing faster than IBM. IBM intends in the future, as it has in the past, to compete vigorously and fairly.

Text of CDC Against IBM

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9. The first experimental electronic digital computer was conceived and constructed commencing in the late 1930's, and several early computers were built during World War II for defense applications. The first commercial computer was delivered in 1951, and by 1953 approximately 50 small computers were installed in the United States, some of which had been installed by Defendant IBM. By the end of 1956, approximately 570 computers had been installed in the United States, having a cumulative value of about \$340 million. The growth of the computer industry has been very rapid since that date, with over 37,000 computers installed in the United States at the end of 1967, plus approximately 17,000 additional computers manufactured by United States companies and installed in foreign countries as of that year end. The total purchase value of these United States and foreign installations was approximately \$18 billion.

Growth of Defendant IBM.

10. Since delivery of its first commercially marketed computer in 1953, Defendant IBM has experienced imposing growth, due principally to the manufacture and marketing of computers. In 1967, Defendant IBM was the eighth largest industrial company in the United States in terms of revenues and the fifth largest in terms of profits. The total stock market value of Defendant IBM's common shares has recently approached \$42 billion, the highest of any private corporation in the world. Such value exceeds the combined value of the shares of approximately two-thirds of the companies which comprise the Dow-Jones industrial average.

11. In 1955, gross revenue of Defendant IBM and its subsidiaries from all activities was \$696,294,457. Five years later, in 1960, such revenues had almost tripled to \$1,816,882,259. By 1967, revenues of IBM and its subsidiaries had again tripled to \$5,345,290,993, representing an increase in revenue of \$4,648,996,536 over the 1955 level or over 650 per cent. The 1967 revenues exceeded 1966 revenues by over \$1 billion or slightly more than 25 per cent. Revenues for the first nine months of 1968 were \$4,908,971,604, representing an increase over the comparable 1967 period of \$1,159,385,281 or more than 31 per cent.

12. Net earnings after taxes of Defendant IBM and its subsidiaries amounted to \$72,695,855 in 1955. In 1967, IBM's net earnings after taxes amounted to \$631,499,558, representing an increase of \$578,803,703, or almost 800 per cent over the 1955 level. The 1967 net earnings exceeded 1966 net earnings by \$125,369,366 or almost 24 per cent, and net earnings for the first nine months of 1968 exceeded the comparable 1967 period by over 37 per cent, after giving effect to the 10 per cent income tax surcharge applicable to 1968.

13. In 1955, net return of Defendant IBM and its subsidiaries on gross revenue (net earnings after taxes as a per cent of gross revenue from sales, service and rentals) was approximately 10 per cent. In 1967, net return of Defendant IBM and its subsidiaries on gross revenue was approximately 12 per cent, reflecting an increase in said net return of almost one-fifth over the 1955 level.

14. In 1965, Defendant IBM spent \$210,932,496 on research and development activities alone, an amount in excess of the value of computer shipments by any other manufacturer in that year. This was an increase of almost \$90,000,000 over the amount it spent in 1961. Defendant IBM has continued to spend in excess of 5 per cent of its total revenues annually for product research and development, expenditures substantially exceeding the dollar value of annual computer shipments which most other manufacturers individually have been able to achieve.

15. During 1967, sales, service and rentals by Defendant IBM and its subsidiaries of computers accounted for well over two-thirds of its gross revenues. Most revenues were derived from lease rather than sale of computers. Defendant IBM is the largest manufacturer-lessor of personal property in the world, with in excess of 80 per cent of its computers on lease the purchase value of which as of year end 1967 was approximately \$11 billion.

16. Worldwide employment by Defendant IBM and its subsidiaries during 1967 grew by over 23,000 to more than 221,000. As of May 31, 1966, Defendant IBM and its subsidiaries employed approximately 55,000 salesmen, systems engineers and customer engineers throughout the world of which approximately 32,000 were employed by Defendant IBM in the United States, its territories and possessions. The number of such employees has increased substantially since that date.

Definition of Markets.

17. The parts of trade or commerce wherein Defendant IBM has committed the violations of law hereafter alleged consist of (i) the manufacture of computers by United States companies or other companies and the marketing or distribution of such computers in the United States by such companies, (ii) the manufacture of computers by United States companies or by foreign companies controlled by them and the marketing or distribution of such computers in foreign trade or commerce by such United States and foreign companies, and (iii) a combination of (i) and (ii), any one of which individually constitutes a part of trade or commerce among the several states or with foreign nations within the meaning of Section 2 of the Sherman Act.

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18. Within each of said three markets exist several product submarkets, identifiable on the basis of unique or distinctive features or characteristics of the computers or unique requirements or preferences of the customers in such submarkets. Such submarkets may be delineated, for example, on the basis of (i) differing capacity and processing speed of the computers, as generally reflected in different sale and lease prices, (ii) differing application or mode of operation of the computers, as often reflected in the differing industry classification of the users of such computers, or (iii) combinations of (i) and (ii). Each submarket of each of the three markets identified in Paragraph 17 individually also constitutes a part of trade or commerce among the several states or with foreign nations within the meaning of Section 2 of the Sherman Act.

V.

VIOLATIONS OF LAW

FIRST COUNT: MONOPOLIZATION.

19. For many years and to the present time, Defendant IBM, directly and through its subsidiaries, has possessed monopoly power in the interstate and foreign computer markets and submarkets, which power it has willfully acquired and maintained, and Defendant IBM has thereby monopolized and combined or conspired with its subsidiaries to monopolize said markets and submarkets in violation of Section 2 of the Sherman Act.

SECOND COUNT: ATTEMPT TO MONOPOLIZE.

20. For many years and to the present time, Defendant IBM, directly and through its subsidiaries, with a dangerous probability and likelihood of succeeding, has engaged in overt acts and conduct with the specific intent to injure or destroy competition in and monopolize the interstate and foreign computer markets and submarkets, and Defendant IBM has thereby attempted to monopolize said markets and submarkets in violation of Section 2 of the Sherman Act.

MONOPOLY POWER IN THE COMPUTER MARKETS AND SUBMARKETS.

21. Defendant IBM for many years has possessed, or has had a dangerous probability and likelihood of possessing, power to control prices or exclude competition with respect to the interstate and foreign computer markets and submarkets:

Market Share of Defendant IBM and Relative Size of Competitors - 1953 through 1962.

(a) Defendant IBM's first commercially marketed computer was the model designated the 701, initially delivered in 1953. The only other significant commercial manufacturer of computers at the time was Remington Rand, Inc., which had acquired two companies whose first deliveries of computers preceded delivery of the IBM 701 by more than two years. By the end of 1956, measured on the basis of total dollar purchase value of installed computers at that time ("cumulative dollar value"), Defendant IBM held over 70 per cent of the interstate and foreign computer markets, and, when measured in terms of total dollar purchase value of computers installed during that year ("incremental dollar value"), Defendant IBM held over 75 per cent of said markets. Through the remainder of the 1950's, Defendant IBM maintained and increased its share of the computer markets and, in the early 1960's, with the advent of so-called "second generation" transistorized computers, Defendant IBM continued to dominate and in fact further increased its percentage share. By 1962, whether measured in cumulative dollar values or incremental dollar values, Defendant IBM held shares of the interstate and foreign computer markets ranging between 77 per cent and 90 per cent.

(b) During the 1950's, several companies in addition to Defendant IBM and Remington Rand, Inc., developed and began to manufacture and market computers. Despite very rapid growth of the computer markets, however, and whether measured in terms of cumulative or incremental dollar values, throughout the period 1956 through 1962 none of the said companies obtained more than a 3 per cent share of any interstate or foreign computer market and cumulatively all of these companies did not achieve more than a 15 per cent share of any market and typically held well below this share. Similarly, during this period, installations by Remington Rand, Inc. declined to where, by 1962, they approximated 7 to 8 per cent of said markets measured in cumulative dollar values and 3 to 4 per cent measured in incremental dollar values.

Market Share of Defendant IBM and Relative Size of Competitors - 1962 to Present.

(c) During the period 1962 through 1965, several of the other computer manufacturers began to experience modest success in marketing computers; there were indications of a possible challenge to Defendant IBM's predominant position in the interstate and

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foreign computer markets. As a result of orders for computers received during 1962-1964, United States computer manufacturers competing with Defendant IBM together accounted for shares approximating 35 per cent of the incremental dollar value of installations during 1964 and 1965 in said markets, although Defendant IBM's shares of said markets measured in cumulative dollar values at each year end remained well above 70 per cent.

(d) On April 7, 1964, Defendant IBM announced and began to formally market its System/360 series of computers which it said represented the most important new product announcement in Defendant IBM's history. Defendant IBM stated that System/360 marked a new era in the development of computers. Esurient marketing by Defendant IBM of System/360 resulted in unprecedented customer orders and, as a corollary, with the installation of the new computers, brought about Defendant IBM's anticipated resurgence of market position. Of an estimated \$3.7 billion in computers installed worldwide by United States manufacturers during 1966, Defendant IBM installed approximately \$2.5 billion or 68 per cent. During 1967, the estimated value of worldwide installations of computers by domestic manufacturers rose by almost \$2.2 billion over installations during 1966, to \$5.9 billion. Defendant IBM's installations rose by \$1.7 billion, to approximately \$4.2 billion during 1967, thus accounting for over 77 per cent of the increased value of 1967 installations. Furthermore, Defendant IBM's installations during 1967 represented an increase over its installations in the preceding year of approximately 70 per cent, substantially exceeding the growth rate for the other domestic computer manufacturers during 1967 which was about 40 per cent. Accordingly, when measured by incremental dollar values, Defendant IBM's shares of the interstate and foreign computer markets increased from between 62 and 70 per cent during 1966 to between 70 and 76 per cent during 1967; moreover, Defendant IBM's computer installations during 1968 have continued at such high levels that its shares of said markets, whether measured in cumulative dollar values or incremental dollar values, have and will substantially exceed its 1967 shares.

(e) Despite the continued extraordinary growth of the interstate and foreign computer markets, the small shares thereof held by Defendant IBM's competitors by 1967, individually or as a group, almost paralleled in size the shares held by the firms which were attempting to compete in 1962. Thus, in terms of incremental dollar values, the second largest domestic manufacturer's worldwide installations of computers during 1967 amounted to about 5.9 per cent of the total worldwide installations by United States manufacturers, followed by the third largest, with about 5.6 per cent of the total. The next five firms each accounted for from 2 per cent to 4 per cent of the total and the remaining firms combined accounted for approximately 1.7 per cent of the total. In terms of cumulative dollar values, the second largest domestic manufacturer's worldwide installations of computers at the end of 1967 was estimated at approximately 7 per cent of the total installations. The next seven firms each accounted for from .7 per cent to 5.3 per cent of the total. All other firms combined accounted for approximately 1.5 per cent of the total.

(f) Relative to the value of computer installations by any of its competitors, installations by Defendant IBM are immense. During 1966, Defendant IBM's estimated incremental dollar value of worldwide computer installations exceeded its next largest domestic competitor by over \$2.2 billion or 9 times, whereas during 1967, Defendant IBM exceeded its next largest competitor by over \$3.8 billion, or over 12 times. Relative to the ninth largest domestic computer manufacturer, Defendant IBM's estimated incremental dollar value of such installations during 1967 was more than \$4.1 billion larger, or 86-fold larger. In terms of cumulative dollar values, Defendant IBM's estimated \$12.5 billion in worldwide installations at the end of 1967 exceeded its next largest domestic competitor by approximately \$11.3 billion or 10 times. Relative to the ninth largest manufacturer, Defendant IBM's estimated cumulative dollar value of such installations at the end of 1967 was almost 100 times greater.

(g) Defendant IBM's shares of and relative size in the computer markets are closely reflected in its shares of and relative size in the computer submarkets. Given its dominant position in the computer markets, over the years Defendant IBM's shares of many computer submarkets have approached and even exceeded 90 per cent. While on occasion certain other companies, in spite of Defendant IBM's power and activities, have managed to obtain shares of certain submarkets somewhat larger than their shares of the computer markets, these rare successes have typically been destroyed or overwhelmed by Defendant IBM's overall power in other computer markets and submarkets, and Defendant IBM has emerged with shares of such submarkets equal to or exceeding its shares of the computer markets generally.

Barriers to Effective Entry Into the Computer Markets and Submarkets.

(h) Over the years, a number of domestic companies attempting to compete with Defendant IBM have abandoned their efforts to manufacture and market computers. The few companies which have remained have been unable to penetrate Defendant IBM's dominance. This has been due to the structure of, and the existence of substantial barriers



A CDC 6600 installation. Control Data apparently contends that IBM caused the cancer.

C Complaint M Practices

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to effective entry into the computer markets and submarkets, which structure and barriers have been consciously nurtured, complemented and constructed by Defendant IBM. Thus, despite the fact that at the end of 1967 the cumulative dollar value of worldwide installations by United States manufacturers exceeded the value of installations one decade earlier by almost 3,000 per cent, and the incremental dollar value of such installations during 1967 exceeded the value of such installations during 1957 by over 2,200 per cent, the number of companies individually accounting for at least one-half per cent of either the cumulative or incremental dollar value of such installations had remained essentially constant at approximately 10. Moreover, aside from these, the incremental dollar value of worldwide computer installations during 1967 by all other domestic manufacturers combined accounted for significantly less than 1 per cent of the total.

(i) A significant deterrent to effective entry into the computer markets and submarkets is that potential entrants require massive aggregations of capital for research and development, to fund computer leases, and to provide associated software and maintenance services.

(j) The vast quantity of computers which Defendant IBM has installed, as well as the extreme complexity of computers, gives Defendant IBM a substantial advantage over competitors or potential competitors in the sale or lease of computers in that:

(i) The number and variety of programs available for use on any manufacturer's computer, as well as personnel trained to write programs for, operate and maintain the computer, are all proportionate to the number of computers which that manufacturer has installed.

(ii) A substantial number of customer personnel engaged in use or procurement of computers were trained on Defendant IBM's computers or formerly employed by Defendant IBM, and they thus are more familiar with and predisposed toward Defendant IBM's computers. Moreover, due to the complex nature of computers and, in general, the short supply of trained personnel, computer customers frequently are compelled to rely upon a computer manufacturer's representations and apparent reputation.

(iii) There is considerable customer resistance to change computer manufacturers. In addition to the cost of hardware, a customer spends substantial sums in training personnel to use the computer, in programming, and in preparing his data and his site for the computer, a large portion of which expenditures may have to be duplicated if the customer replaces that computer with another manufacturer's computer.

Profits and Pricing Power.

(k) A number of computer manufacturers have been forced to abandon the computer markets and submarkets due to inability to realize profits and, indeed, most companies which remain have absorbed significant losses. Defendant IBM, on the other hand, has continuously enjoyed substantial profits and a wide choice of profitable alternatives in the manufacture and marketing of its computers.

(l) Defendant IBM exercises price leadership in the computer industry, and, therefore, the sale and lease prices and other terms and conditions of computers manufactured and marketed by other companies must in large part be determined by them relative to prices, terms and conditions established by Defendant IBM. Moreover, Defendant IBM's pricing power is enhanced because over the years its product line has blanketed the industry, whereas the smaller companies have typically been forced to concentrate on the design, manufacture and marketing of more limited product lines.

22. The manufacture and marketing of computers is one of the most rapidly growing and important segments of the United States economy and contributes substantially to the technological leadership of the nation as well as its national defense. Despite the entry of a Final Judgment directed against Defendant IBM's power and activities in the tabulating systems industry, Defendant IBM built upon its power within that industry to achieve similar dominance in the computer markets and submarkets by the mid-1950's and has retained such power up to the present time.

EXCLUSIONARY PRACTICES.

23. Defendant IBM, directly and through its subsidiaries, has wilfully acquired and maintained monopoly power in the computer markets and submarkets, or has had the specific intent to obtain such power, in that it has consciously, deliberately, or intentionally engaged in the following acts, behavior, conduct and practices, among others:



cancellation of orders for this system by prematurely announcing the 360/91.

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Development, Delivery, and Performance of Hardware and Software - "Paper Machines and Phantom Computers".

(a) It has misrepresented the status of design, development, production, and performance of certain of its computers, and programs or software for certain computers, particularly with regard to the capabilities and availability of large size computers, time sharing computers, and compatibility between models of computers, all for the purpose or with the effect of depriving customers of the opportunity to accurately evaluate competitive computers, thus obtaining or retaining customers for itself and depriving Plaintiff and other manufacturers of sales;

(b) It has, as a means of obtaining or retaining customers and depriving Plaintiff and other manufacturers of sales, offered to lease, sell, or make delivery of, and has entered into agreements to lease, sell, or make delivery of computers, software or programs which were not yet in production, for which it was not ready to commence production, and as to which it had no reasonable basis for believing that production or delivery could be accomplished within the time periods specified by such offers or agreements;

(c) It has, having prematurely announced and marketed its computers to deprive its competitors of sales and due to computer development and production deficiencies arising from such premature announcement, frequently changed and delayed its previously announced or promised delivery schedule, as well as announced or introduced changes in, or cancellations of, certain types or models of computers, their specifications and alleged capabilities, thereby creating confusion in the market and, at great cost to its competitors and its customers, deferring procurements until its competitive deficiencies could be discovered or overcome and maximizing its revenues on outdated computers on lease;

(d) It has repeatedly entered into contracts, commitments, and letters of intent in which it was obligated to furnish computers and software and, having deprived its competitors of such sales, has then failed to fulfill the obligations undertaken in such contracts, commitments, and letters of intent;

(e) It has consistently induced customers, upon the execution of a contract with it, or even prior thereto, to expend substantial sums of money preparing data, training personnel, preparing a program, and preparing for the use of certain computers, software or programs, all for the purpose or with the effect of irrevocably tying the customer to its computer irrespective of actual delivery or performance of the computer or software thereby precluding said customers from acquiring computers from Plaintiff and other manufacturers;

The actions of Defendant IBM alleged in the foregoing subparagraphs (a) through (e) were taken with knowledge of and to take advantage of its dominant position in the computer markets and submarkets. Because of the large dollar investment in computers, their complexity, the difficulties of verifying claimed specifications of undelivered products, and a history of rapid technological obsolescence of computers, customers in the computer markets and submarkets readily rely upon representations and promises of Defendant IBM. This is particularly true when the representations concern a new product line of computers allegedly meeting all needs of customers and compatible from smallest to largest.

Discriminatory and Exclusionary Pricing Practices.

(f) It has directly and indirectly offered discriminatory prices and discriminatory services and technical assistance to some customers not given to other customers, including, among others, outright discounts from standard published prices, free "trial" computer usage for extended periods of time, buybacks of computer time which it may or may not utilize, discounts in the form of fictitious "value received" contracts, extended purchase plans, and substantial commitments of free manpower for programming, maintenance and systems support. The recipients of such prejudicial favoritism are typically customers or members of a class of customers where:

(i) Defendant IBM's market share or power is less dominant or it is threatened by and encountering more intense competition; or

(ii) Defendant IBM stands to gain certain ancillary benefits or prestige in furtherance of its predominant position in the computer markets and submarkets;

(g) It has established sale and lease prices for some types or models of computers at levels which would result in a significantly lower percentage of return on gross receipts and investment than was realized from the prices established for other computers with respect to which it has a more dominant market position, or, with respect to which Plaintiff or other competitors have not threatened its market position, and it has used its profits or revenues from the sale or lease of some types or models of computers to subsidize its activities with respect to the marketing of types or models threatened by competition;

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(h) It has sold or leased computers to customers located in some geographical areas at a lower rate of return on investment or sales than is realized in other geographical areas;

(i) It has sold or leased some computers at a loss for the purpose or with the effect of hindering competition;

(j) It has offered discriminatory prices and other concessions to hold its existing customers and to thereby discourage them from replacing Defendant IBM's computers with computers manufactured by others, including:

(i) The allowance of substantially reduced rentals on its installed computers during, and sometimes beyond, the period such computers are being replaced, but only if they are being replaced by Defendant IBM's computers; and

(ii) The allowance of a portion of the rentals paid Defendant IBM by a user with respect to an installed computer as a credit toward the purchase of that computer or, more significantly, toward the purchase of a different model computer, provided it is a computer manufactured by Defendant IBM;

(k) It has marketed and tied together as a package certain products and services, such as maintenance services to leased computers as well as certain software to sold or leased computers, rather than separately pricing each product or service, for the purpose or with the effect of:

(i) Preventing the creation of hardware maintenance companies independent of computer manufacturers;

(ii) Hindering the development of software companies independent of computer manufacturers;

(iii) Camouflaging the grant of discriminatory prices and concessions; and

(iv) Requiring any potential competitor in the computer markets or submarkets to have large aggregations of capital in order to effectively compete,

Exploitation of Size to Structure the Computer Markets and Submarkets.

(l) It has set technical standards, frequently unnecessary and without prior notice to the industry or customers, which standards were in part designed to or had the effect of reducing the marketability of the computers or peripheral equipment of its competitors, permanently or at least temporarily until such time as they conformed to such standards or until customers determined that the standards were not required;

(m) It has formed joint ventures with its customers and customer groups on a discriminatory basis to develop new computer program languages for use in its marketing efforts, and has then used its predominant position in such ventures to deny Plaintiff and other competitors and their customers participation therein or access to the achievements thereof;

(n) It has created an undue financial burden on its competitors and potential competitors, prevented development or growth of independent computer maintenance organizations and a used computer market and, generally, retained control over the majority of computers in use and promoted continuous customer dependence on and contact with it, by consistently encouraging leasing and discouraging sale of computers in the following ways, among others:

(i) Trading upon customers' fear of rapid obsolescence of computers as a market characteristic, and compounding that characteristic by repeatedly, and often unnecessarily, introducing new models, rapidly changing model numbers and otherwise creating uncertainty and confusion among customers;

(ii) Pricing its computers to make leasing costs, either in fact or in appearance, economically more advantageous than purchase costs, particularly as compared with prices of its competitors;

(iii) Increasing maintenance charges on purchased computers without corresponding increases for maintenance included in rental prices;

(iv) Making available certain of the price concessions referred to in subparagraph (j) above to customers leasing its computers but not making comparable concessions to purchasers;

(v) Establishing low trade-in values for used computers which were initially sold new by it despite maintaining resale prices for its used computers at levels near the price for new computers of the same model;

Text of Control Data Complaint Against IBM

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(vi) Lowering charges for overtime use of rented computers without corresponding decreases in purchase prices; and

(vii) Adjusting the discount available for purchase of installed computers on rental with the effect of discouraging immediate purchase;

(c) It has unreasonably stressed and exploited its predominant market position by, among other things, carrying on multimillion dollar advertising campaigns wherein it has touted, for example, its extensive installations of computers in all industries and geographical areas, its software library and the libraries of its user organizations, as well as its massive force of systems analysts, maintenance, and other personnel, all in order to lead customers to believe that its computers, software, and total services are superior to Plaintiff's and other competitors' and that it alone all other competitors offers complete understanding of and solutions to the diverse problems, requirements, fears and desires of all customers;

Coercion of Employees.

(p) It has encouraged its salesman and other personnel to employ the marketing practices alleged herein and other anticompetitive practices by imposing unreasonable quotas and severe penalties for the loss of orders, customers, or prospects;

(q) It has imposed unreasonable barriers against its employees working for competitors following termination of their employment with Defendant IBM;

Coercion In and Improper Influence of Customer Procurements.

(r) It has directed threats, expressed or implied, and other forms of intimidation and coercion, at customer procurement personnel to influence their judgment and induce the acquisition of its computers without regard to price or performance and thereby discourage and prevent the acquisition of computers manufactured by competitors;

(s) It has offered computers to customers upon terms which include an unreasonable requirement of immediate acceptance by the customers, thereby imposing unreasonable pressure to decide immediately without giving due consideration to computers of competitors;

(t) It has, upon learning of a customer's impending decision to acquire a competitor's computer, sought to delay or impede that decision by reopening the evaluation or submitting new proposals, and it has otherwise wrongfully interfered with and attempted to terminate negotiations or contracts between customers and competitors, thus delaying or depriving competitors of sales and creating additional expenses for customers;

(u) It has unreasonably refused to extend leases of its computers, pending the delivery of replacement computers, for customers who have contracted to replace such computers with those of competitors;

(v) It has participated or attempted to participate with customers in the preparation and evaluation of plans for procurement, specifications, requests for procurement and "benchmark" tests for the purpose or with the effect of preventing such customers from enjoying the advantages of competition as well as depriving competitors of sales;

(w) It has discouraged and sometimes refused to allow or to perform, tests comparing the performance of the computers proposed by it with the performance of the computers proposed by competitors, and on certain of those occasions where competitive tests have been insisted upon and undertaken, it has misrepresented the performance of its computers on such tests;

(x) It has unreasonably exploited the fact that a substantial number of procurement personnel employed by customers formerly were employed or trained by Defendant IBM or trained on its computers and it has caused or arranged for its officers, directors or employees to serve as officers, directors, consultants to, or employees of customers, as well as causing or arranging for representatives of customers to hold similar positions with it, all for the purpose or with the effect of influencing customer procurement decisions and depriving competitors of sales;

Reciprocal Marketing Practices.

(y) It has built or located its plants and other facilities near the geographical locations of certain key customers, or it has referred to the probabilities of such action in the course of its efforts to market computers, for the purpose or with the effect of inducing the acquisition of its computers;

Page 10

(a) It has utilized its reciprocal buying power to influence the computer procurement decisions of customers;

(aa) It has discriminatorily bestowed favors on certain selected customers, or their employees, by offering or making grants of funds or other economic assistance to such customers or employees, but tying said grants or assistance to a condition that its computers be acquired or retained by such customers;

Disparagement.

(bb) It has unfavorably represented and falsely disparaged Plaintiff's computers, software, maintenance policies, personnel, financial position and overall capabilities;

Exclusionary Contract Practices.

(cc) It has employed very informal, and frequently oral, negotiating and contracting techniques for the purposes or with the effects, among others, of encouraging premature customer preparation for receipt of its computers and of camouflaging and facilitating the unfair practices alleged herein. Said techniques have included:

(i) The urging of customers to give to it informal orders or "letters of intent" to acquire an IBM computer, containing no terms or specifications and ostensibly designed to merely reserve for the customer a place on its delivery schedule without legally committing the customer, except that thereafter it pressures the customer to confirm its order or supposedly be eliminated from the delivery sequence;

(ii) The use of master contracts for many customers, originating with the first equipment the customer ever acquired from Defendant IBM—frequently tabulating equipment—and accordingly lacking written particulars concerning the terms, specifications, prices or manpower commitments made by Defendant IBM for the customer's subsequent computer procurements;

Discrimination Against Other Computer Manufacturers and Their Customers.

(dd) It has taken advantage of Plaintiff's and other of its competitors' dependence upon it as a source of certain peripheral equipment and supplies by refusing to deal with such companies, or by insisting upon restrictive terms and conditions, for the purpose or with the effect of financially injuring Plaintiff and other manufacturers and preventing them from competing;

(ee) It has established production and delivery schedules for replacement parts and components produced by it which are designed to give preference to users of its computers and discriminate against the users of Plaintiff's or other competitors' computers who, as part of their computer systems, must have access to replacement parts and components produced by Defendant IBM, to the detriment of its competitors and their customers;

Bait and Switch.

(ff) It has deceived customers and deprived Plaintiff of sales by securing contracts, commitments, or letters of intent from customers for computers, particularly large size computers, and having eliminated its competitors, sought to cancel the contract, commitment, or letter of intent and in lieu thereof, either market a computer more likely to be developed or delivered by it, or a more expensive computer more likely to fulfill the promises made to the customer;

Nonsequential Deliveries.

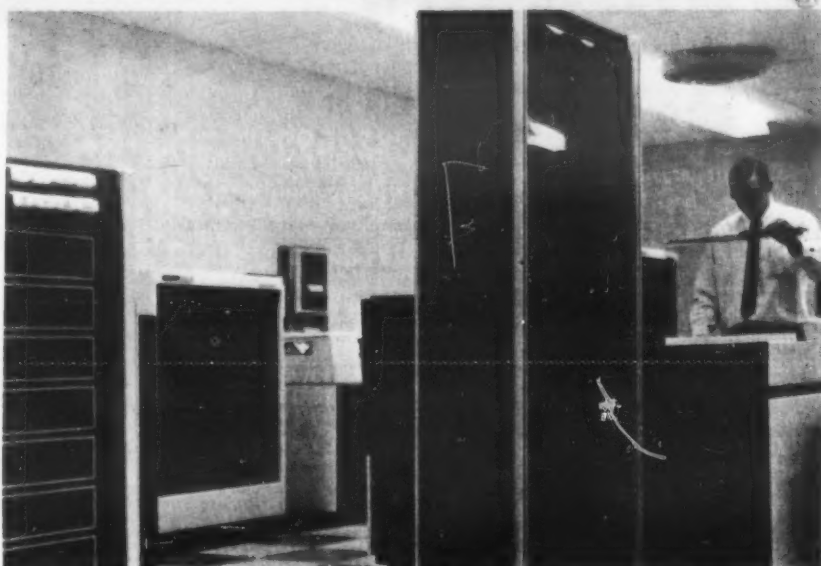
(gg) It has rearranged and manipulated its delivery schedules for computers in the light of competitive considerations by offering discriminatory delivery preferences to some customers at the expense of others;

Joint Marketing.

(hh) It has engaged in joint marketing efforts with The Service Bureau Corporation, its wholly owned subsidiary, and has used said subsidiary as well as its data centers and test centers as vehicles through which to lock-in customers and through which to grant discriminatory price concessions—cluding free usage of computer time, free manpower for software support, and buybacks of computer time or programs;

Consent Decree.

(ii) It has, contrary to the terms, conditions and intent of its 1956 Consent Decree, directly entered into the time-sharing service business, thereby exploiting its position as the dominant computer manufacturer as well as locking in potential computer customers;



This is a work station for the CDC 7600, the largest, fastest computer in the world and Control Data's latest market entry. There has been conjecture that CDC filed the suit to prevent IBM from counterattacking against it the way IBM assertedly counterattacked against the earlier CDC 6600.

Page 11

Patents.

(jj) It has acquired several thousand United States and foreign patents, patent rights and options to obtain patent rights pertaining to computers and has used its patent position to entrench its monopoly power; and

Acquisition.

(kk) It acquired in 1964 the assets and business of Science Research Associates, Inc., a firm engaged in the development and publication of instructional materials in basic subjects for elementary schools, high schools, and universities, and the development and production of a variety of intelligence, aptitude and achievement tests, thereby entrenching its position in the developing market of computerized education.

VI.

DAMAGE TO PLAINTIFF

24. The aforesaid violations by Defendant IBM have been the cause of substantial and irreparable damage to the business and property of Plaintiff in that, among other things, Plaintiff has been temporarily and often permanently deprived of innumerable sales and leases of computers. As a result, Plaintiff has lost significant revenues and profits from such sales and leases of computers and peripheral equipment and from the providing of related software and maintenance services. Additionally, Plaintiff has been deprived of profits which, but for the aforesaid violations, would have been realized in connection with sales or leases of computers in fact made by Plaintiff. In turn, the direct loss or delay of revenues and profits has, among other things, greatly impaired Plaintiff's growth and development, including technological development, with the consequent further loss of additional sales and leases. In some instances, Defendant IBM's illegal conduct has barred Plaintiff from marketing computers in an entire computer submarket. The actual damage to the business and property of Plaintiff from the illegal conduct of Defendant IBM is thus extensive, the exact amount of which remains to be determined.

25. The illegal conduct of the Defendant IBM herein complained of is of a continuing nature. Unless enjoined, Defendant IBM will not refrain from doing the things complained of and the unlawful activities will continue to the further irreparable loss and damage of Plaintiff. In addition, customers and the public will continue to suffer considerable financial damage, to be discriminated against, to be confused and have their operations disrupted, and generally to be deprived of the benefits of free and unrestrained competition in the computer markets and submarkets. The Plaintiff has no complete and adequate remedy at law.

VII.

PRAYER FOR RELIEF

WHEREFORE Plaintiff prays:

(1) That the Court adjudge and decree that Defendant IBM, directly and through combination and conspiracy with its subsidiaries, has attempted to monopolize, has combined and conspired to monopolize, and has monopolized the interstate and foreign computer markets and submarkets in violation of Section 2 of the Sherman Act.

(2) That the Court issue an injunction restraining Defendant IBM, its officers, directors, employees, agents, representatives, and successors, from engaging in the aforesaid violations of law, and from engaging in the specific exclusionary practices alleged in paragraph 23 (a) through (kk) and any other practices found to be exclusionary.

(3) That the Court decree such affirmative injunctive relief, including dissolution of the business or divestiture of properties of Defendant IBM, or enter such orders as may be necessary to dissipate the effects of the violations alleged herein and to insure competitive conditions in the computer markets and submarkets.

(4) That a judgment be entered in favor of the Plaintiff for treble the amount of its actual damages, as provided by law.

(5) That the Court allow, and that Defendant be required to pay, the full costs of this suit, including as a part thereof a reasonable fee for the services of Plaintiff's attorneys.

(6) That the Plaintiff be granted such other, further and different relief as the

Page 12

nature of the case may require and as may seem just and appropriate to this Court both to promote competition and protect computer customers and the public.

OPPENHEIMER, ROOGSON, BROWN,
WOLFF AND LEACH

By John G. Robertson
Attorneys for Plaintiff
W-1781 First National Bank Building
Saint Paul, Minnesota 55101
Telephone: 612-227-7271

JURY DEMAND

The Plaintiff, pursuant to Rule 38 of the Federal Rules of Civil Procedure, does hereby demand a jury trial of all the issues of fact raised by its Complaint herein except as to the equitable relief demanded.

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\$1 Billion 'Gift' Refused By Government: Caveney

(Continued from Page 10)

The solution is not more administration, but more efficient management practices. As John Kenneth Galbraith pointed out in the *New Industrial State*, one can favor technological bigness and oppose administrative bigness without inconsistency. In fact, advanced technology tends to streamline activities. It also makes them less subject to bureaucratic whims.

What the federal government needs are technically oriented managers. People with an understanding of technology, who are able to understand the technical language and concepts of the various sciences. Only a properly trained management oriented individual can properly manage technical programs vital to this nation's economic and social well-being. The ability and will to manage is at least as important as the technical background. These people cannot be like the postmaster quoted when asked how he managed his operation: "I don't manage it, I simply administer it."

Center for Technology

I propose the establishment of a Center for Technology in the Legislative Branch or in the White House. Recently developed evidence on the M-16, F-111, and Air Force Phase II computer contracts suggests that such a center could more than pay its own way by reducing procurement waste of tax dollars. The center director would report directly to the leaders of the House and Senate or to the President.

This center would have two objectives: (1) Act as a court of appeal for government employees who have had their technical suggestion turned down by the chain of command within the Executive Branch and (2) to allow suggestions from individual taxpayers and the academic and business communities to be given proper attention.

Such a center would put a brake on present procurement practices for major technological purchases. It would provide sophisticated analysis of agency positions and present them to the Congress and the President in layman's terms. It would be an expert objective audiovisual unit for Congress and the President that would act as a counterbalance to the tables full of agency witnesses congressmen now see.

Congress would still appropriate funds, but the Executive Branch could not make a contract award for major technological items without all proposals and contract award recommendations being first reviewed by the center and explained to the appropriate committee of Congress or the President.

We must all demand an affirmative and constructive spirit regarding institutional changes within Government. We must also encourage the development of those attributes within the governmental service that will steadily push the frontier of knowledge farther into the area marked unknown while managing in a manner that will evoke the best from those that labor at all levels of Government.

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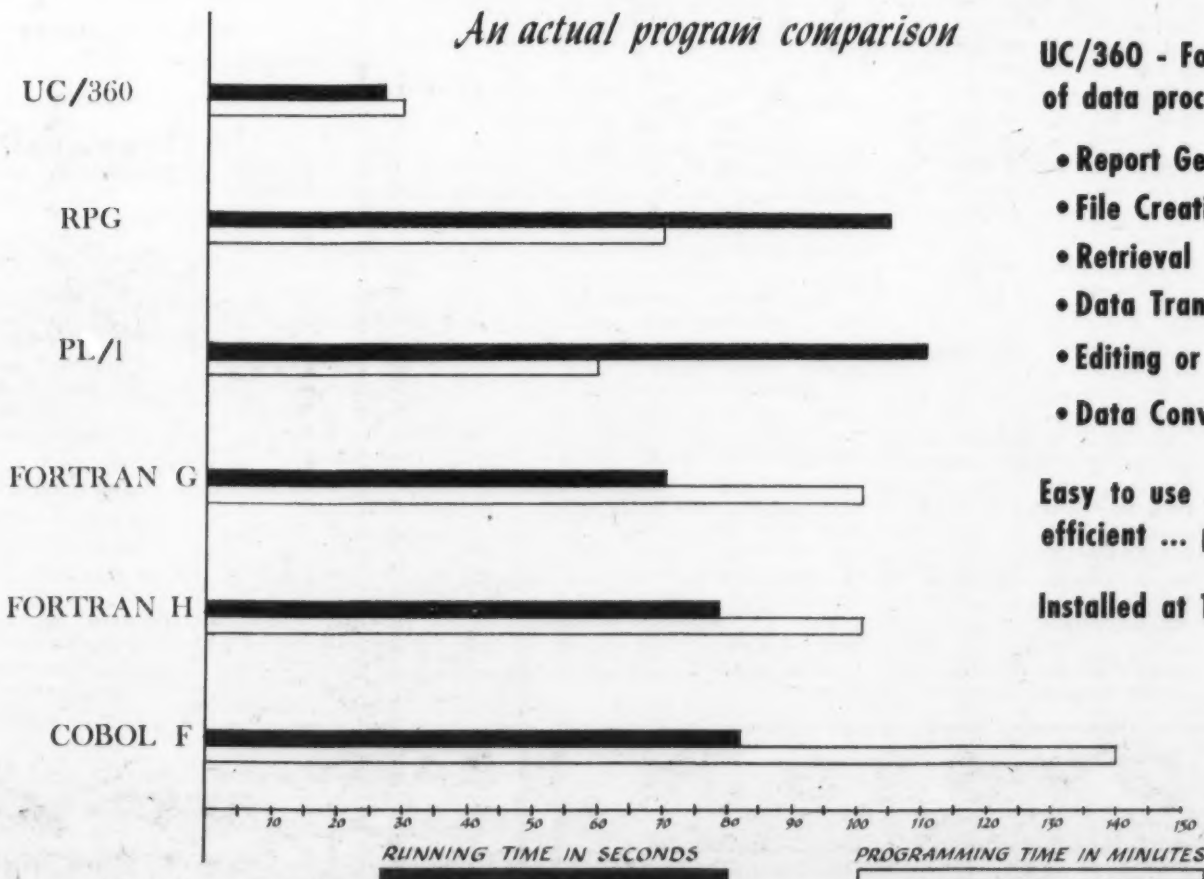
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'Basic' Adopted for Call/360, But With Several Changes

By Peter L. Briggs

Of the CW Technical Staff

When IBM announced that it had decided to use Basic as the primary language in its new Call/360 time sharing system, it accepted the reality of Basic's popularity and usefulness as a major time sharing language.

It was believed to be the first time that IBM had adopted for a major service a language in which it had not helped to design or develop.

Language Modifications

In adapting Basic to Call/360, IBM made a number of changes during implementation. The user who is familiar with Basic will no doubt find some unexpected differences.

The differences lie in input/output, optional keywords, and the implementation limitations on certain facilities. Arithmetic problems, as usual, crop up now and then. The final, and most significant, difference lies in the documentation. Basic has always been intended to be easy to learn. This is no longer completely true.

Input/Output

In the I/O area, IBM has introduced a new feature to Basic. This feature, the "PRINT USING n," brings Basic back to the Fortran input conventions and shows no sign of being otherwise necessary in the language. IBM has also neglected to implement the "Mat" instructions. These instructions allow the user to input and output data directly to and from matrices without looping through the subscripts. This looping requires much more processing time and much more user coding than the Mat instructions. With a limit on the number of statements permitted in a Basic program, this presents problems.

Keywords

IBM has made it optional to use certain keywords. The "Let" keyword in assignment statements is an excellent example. It certainly does reduce coding for the user, and doesn't interfere too seriously with the naturalness of the language. It does, however, introduce the usual compatibility problems. In a case where a program has been written on the Call/360 system, stored on paper tape, and later run on the Dartmouth system, the absence of the Let keyword will prevent the program from running, due to diagnostics.

Matrix Manipulation

Another problem with the changes in matrix manipulation appears when a matrix is de-



Peter Briggs, using an IBM 2741 terminal at Computerworld, inputs a program in Basic to a remote time sharing service.

fined. In this case it appears that IBM has chosen the more natural course, rather than Dartmouth. In Dartmouth Basic, array subscripts are started from zero. In Call/360 they start at one. In other words, if you dimension an array as "DIM (5,6)," under Call/360 the array will contain 30 elements and under Dartmouth it will contain 42 elements. This is a problem of both compatibility and naturalness. For most commercial users, the use of zero as a number is most unlikely; it is much more natural to start counting from one.

Variables

Whenever double precision floating point (real) variables are used, there is always the problem of comparisons. IBM has had several problems with comparing fields in double precision format. The extra bits which are used in double precision variables, but they are compared. Results have been unpredictable in the past, and there is no sign that they have solved the problem.

Documentation

The final, and highly important, area of difference is in the documentation. The principle purpose of Basic has always been to make it simple for the non-programmer to learn the language while actually using the terminal. This becomes very difficult when the IBM Call/360 Basic Handbook (J20-0043-1) is spread over so many pages with so little information content and so much blank space. It is all well and good to leave room for expansion, but beyond a certain point it confuses the reader rather than helps him. The information is there in general; it is

just very difficult to follow the logic of the language without some sort of formal education. The Basic handbook is not a self-teaching guide, it is a pure reference manual. This problem can be solved by the additional study of Mario Farina's *Programming in Basic*, the standard text on Basic. It is necessary to watch out for the areas of difference, though, because Farina had never heard of Call/360 when he wrote the book.

In general, the command language has a few drawbacks, mostly in the area of conciseness. With a very few exceptions, abbreviating the system commands in Call/360 is not permitted. Therefore, the user must do more typing, spend more time connected, and remember more complicated command formats.

Allowing for the noted drawbacks, IBM has managed to retain the general orientation of Basic and not make it too difficult for the user to access his system.

Basic, the language created at Dartmouth College by Professors John G. Kemeny and Thomas E. Kurtz under a National Science Foundation grant, has become the new standard for time sharing system languages. General Electric has made a great deal of use of the language in their various time sharing systems, and Dartmouth College has continued to expand its capabilities. Other manufacturers have adopted Basic into their repertory, in cases where it has been shown that ease of learning is a major factor in popularity. The general philosophy of Basic has been to keep it flexible, simple, and very easy to learn.

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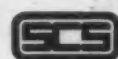


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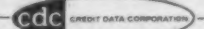
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P****CDC Centers Plan to Make Mac/Ran Package Available**

LOS ANGELES — The Mac/Ran package of data analysis programs, written by Digitek Corp., will soon be available for all customers of CDC Data Centers.

The package, used for time series analysis and random processes' data reduction, was developed by Measurement Analysis Corp., a Digitek subsidiary. It is currently available for industrial use through a leasing plan, and will continue to be available on this basis from the developer.

CDC has obtained exclusive data center rights to the package for an amount, estimated to be in excess of \$100,000, spread over the next three years.

According to James R. Dunlap, Digitek's president, "The agreement represents the first time a major computer company has made a single, advanced software system of applications programs available on such a large scale."

Plans call for making the system available worldwide during 1969 at all CDC Data Centers. CDC hopes that the extensive availability of the system will facilitate standardization and acceptance of results among vari-

ous CDC customers at different locations.

New Graphics Program

ANAHEIM, Calif. — A system to produce network drawings of Critical Path Method (CPM) project schedules has been announced by California Computer Products.

The program, designated Auto-net (Automatic Network Display) is compatible with most currently used CPM programs, according to the manufacturer, and can be used with CalComp's line of digital plotting equipment.

The program accepts output from a standard CPM computer program and converts the output into commands for the plotter. The program can be used on-line, or it can prepare tapes for off-line use.

PDP/1130 Assembler

RYE, N.Y. — A new program to assemble programs for Digital Equipment's line of PDP/8 and PDP/9 computers is now available for the IBM 1130.

The Symbolic Assembler, written by Infotec, requires an 8K 1130 with the standard configuration (card reader, card punch, paper tape punch, and one disk) and will produce punched paper tapes suitable for running directly on the PDP machine in a small fraction of the time required for assembly on the PDP itself, according to the developers.

The program compiles in one pass, instead of the three required on the PDP PAL III system, uses cards for input rather than paper tape and produces better listings and diagnostics, according to a company spokesman.

The program is available as a service at 5 cents per line from Infotec, or is available for sale in the range of \$2500 to \$4000 depending on special arrangements.

Multiuser DEC Focal

MAYNARD, Mass. — Multiuser versions of Digital Equipment's conversational mathematical language, Focal, have been announced for the PDP/8 and PDP/9 lines of computers.

The first of these packages, a two-user version for the small PDP/8 line, was shown recently, and a four-user version was announced immediately afterwards. The four-user versions will be available early this year for all 8K PDP machines.

Focal (Formula Calculator) is similar to Joss, and is "one of the most powerful languages developed for the small scale computer," according to a company spokesman. The proprietary language was developed by DEC, and is currently available on all PDP machines in a single-user environment.

Installment Loan System

SAN DIEGO, Calif. — A \$2000 installment loan package for banks is available from Process Consulting, Inc.

The package provides facilities for reminders, delinquency notices, payment cards, notice listings, and all the other functions

associated with installment loan management and bookkeeping, according to the company.

The system includes a complete set of management reports. The programs produce information suitable for integration into any general purpose banking information system.

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New Literature

Data Processing, Vol. XIII, a 371 page hardbound book, contains management and technical material presented at the DPMA 1968 International Data Processing Conference recently held in Washington, D.C. Subject material is grouped in 11 chapters and fully illustrated. Cost is \$9.95 to DPMA members, \$11.95 to others, plus a \$.25 handling and postage charge. Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

Potential users of aerospace management methods, private and public, are surveyed in a new publication by Nasa. "Applications of Systems Analysis Models" was written under contract for Nasa and issued to enable industry and other government agencies to benefit from Nasa's experience and findings. The publication discusses the adaptation and application of methods to problems that confront management and deals with use of modern techniques for solving them. Nasa SP-5048, \$5.00, Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

A brochure describing a new approach to magnetic tape cleaning, "A Systems Approach to Tape Maintenance," includes cleaning with the Mark II tape cleaner, punching master cards with the MP461 and utilizing a Cobol oriented management reporting system. Data Devices Inc., 18666 Topham Ave., Tazana, Calif.

A new brochure notes seven common sources of computer output congestion and describes the Xerox CFP printer. Xerox Corp., Xerox Sq., Rochester, N.Y. 14603.

A new illustrated brochure describes the CC-30 communications station and its applications. A graphic design illustrates possible configurations. Control and function characters of the CC-301 are defined. Computer Communications, Inc., 701 W. Manchester Blvd., Inglewood, Calif. 90801.

Actual data communications systems are detailed in two new case history brochures. One brochure describes how a modern data communications network of teleprinter terminals speeds order processing. The second brochure tells how a nationwide terminal network enables one company to mail invoices the day after sales are made. Case histories are presented in typical magazine feature article form. Write Dept. SP-80, Teletype Corp., 5555 Touhy Ave., Skokie, Ill. 60076.

Included in the quarterly magazine, *Interface 16*, is an article entitled "SDS and the Industry in Perspective." Copies may be obtained from the Sales Promotion Dept., Scientific Data Systems, 701 S. Aviation Blvd., El Segundo, Calif. 90245.

A 40 page catalog, No. 700-0125, illustrates and describes 11 calculators, including time sharing models. It contains detailed specifications, prices, and typical configurations. Available from Wang Laboratories, 836 North St., Tewksbury, Mass. 01876.

McCall Information Opens a \$10 Million Data Center

FULLERTON, Calif. — McCall Information Services Co., a division of McCall Corp., New York, has opened a commercial computer service facility here equipped with four IBM computers and related equipment valued at \$10 million. The center was formally dedicated by David Mahoney, president of Norton Simon, Inc., of which McCall is a subsidiary.

Mr. Mahoney said that the facilities might be used to form a data bank of information using the files and resources of the three McCall magazines, university, and research sources.

Max L. Mueller, group vice president, will head the new facility. Other staff members are Phillip A. Cramer, western regional general manager; Thomas



R. Sheehan, assistant manager; Thomas J. Getzinger, controller; and Paul Valeri, marketing manager.

Data & Information Opens Ohio Office

PRINCETON, N.J. — Data & Information Products, Inc., an Applied Data Research, Inc. subsidiary, has opened an office at 21330 Center Ridge Rd., Cleveland, to market proprietary software. Lee Jablonski has been

appointed office manager.

AIM Opens Eastern Office

ENCINO, Calif. — AIM, a software company, has opened an eastern regional office at 17 Sherwood Place, Greenwich, Conn. The new office will be managed by Fred Flannell.

URS Opens Seattle Office

SAN MATEO, Calif. — URS Systems Corp., a computer soft-

ware company, has opened a new office at 2909 Third Ave., Seattle, to serve accounts in the Pacific northwest. Heading the office is Delbert Brown.

FMC Corp. to Construct 36,700 Sq. Ft. Building

SAN JOSE, Calif. — FMC Corp. plans to construct a new building in the Airport Industrial Park, Santa Clara, to house the company's Management Information Systems staff and computer center, as well as the FMC Machinery International operations. The project is scheduled for completion in seven months.

Robins Forms New Division

FLUSHING, N.Y. — Robins Industries Corp. has set up a separate division to handle its electronic, audio, and data processing products. The new division will be headed by Jack Friedland, a vice president of the company.

Computicket Corp. Moves Into Larger Quarters

NEW YORK — Computicket Corp. has moved into the Paramount Theatre Bldg., 1501 Broadway. The new quarters will house two IBM 360/40 computers. Computicket is a subsidiary of Computer Sciences Corp.

Photo Magnetic Systems Forms Subsidiary

CHICAGO — Photo Magnetic Systems, Inc. has opened a subsidiary, Computer Telephone Co. of Chicago, Inc., at 111 W. Washington St. Officers of the new corporation are John J. Secan, president and treasurer; William J. Harte, secretary; and Stanley J. Balwierz, vice president.

General Automation Opens Ten Sales Offices

ORANGE, Calif. — General Automation, Inc. has announced the opening of 10 sales offices to expand marketing of its general purpose computers. The company's national sales force will be controlled from five regional offices.

orders and installations

Northwestern Life Insurance Co., Seattle, Wash., has installed a Univac 9300 computer system for processing ordinary and special risk insurance, statistical reporting and calculation of commissions, preparation of premium notices, and agency reporting.

The Hunter Valley County Council, Sydney, Australia, an electric utility company, has ordered an NCR Century 100 computer consisting of a 16,000 character memory, paper tape reader, printers, and two dual-disk units. Intended applications are office billing, inventory control, payroll, and cost and expenditure accounting.

Denby's, Troy, N.Y., a department store, has installed a Univac 9200 computer system to be used for sales reports, accounts payable and receivable, and buyer's summaries.

Schweppes Ltd., London, has ordered an ICL 4-50 computer system to replace an ICL KDF8 presently in use, as well as IBM and NCR peripheral equipment. Applications intended are marketing and selling, stock and distribution control, production planning, and cost and financial accounting.

Y & S Candies, Inc., Brooklyn, N.Y., has ordered an NCR Century 100 computer system for sales forecasting, labor and production analysis, inventory control, billing, accounts receivable, and payroll.

Chittenden & Eastman Co., Burlington, Iowa, has ordered a Univac 9200 computer system to replace tabulating equipment currently in use. Typical applications will be billing, invoicing, and sales analysis. Delivery is scheduled for this month.

The James E. Crass Coca-Cola Bottling Plants, Inc., Richmond, Va., has ordered a Univac 9400 computer system to service its 63,000 retail outlets. Original applications will include route accounting and control, route statistics, and general administration. Delivery is scheduled for next fall.

Six of the Province of Quebec's new government operated commercial colleges have ordered NCR Century 100 computers. The first delivery is scheduled this month to the Colleges D'Enseignement General et Professionnel. The systems will be used for EDP instruction in languages, programming, and systems analysis.



The Chas. H. Lilly Co., Portland, Ore., a manufacturer and distributor of fertilizers and weed control products, has ordered a Univac 9200 computer system to replace punched card equipment presently in use. Delivery is scheduled for this spring.

IBM has installed a North Atlantic Industries multichannel computer interface subsystem in its Federal Systems Division, Owego, N.Y., where it will be used in a simulation laboratory to study and evaluate prototype avionics systems. One of the first applications will be to check out parts of the A7 D/E avionics package. Other applications range from deep space to anti-submarine warfare programs.

New OTC Quotation Service Will Speed Data to Brokers

NEW YORK — An automated over-the-counter market quotation service, which will speed information to brokers and others, will be built and operated by Bunker-Ramo Corp. under a seven year contract with the National Association of Securities Dealers.

The NASD, a national organization of some 3800 broker/dealer securities firms, headquartered in Washington, D.C., is charged with the responsibility of regulating the unlisted securities markets and its members and salesmen that do business in this area.

Scheduled for 1970

Called Nasdaq, the computer network for OTC quotations is scheduled to become operational in late 1970. It will initially provide quotations on about 1500 OTC stock issues through the network of CRT terminals currently in offices of brokers, retail traders, and market makers in all parts of the country. A market maker is a securities firm

that maintains an inventory in particular stocks and continuously stands ready to buy and sell in these issues. Nasdaq will be capable of handling as many as 20,000 different OTC issues.

"The implementation of the system will provide the quantity and quality of OTC trading information that has been long sought for the investing public," said NASD President Richard B. Walbert.

Walbert pointed out that in addition to relieving many of the present burdens connected with supplying over-the-counter quotations information, newspaper bid and ask prices would be substantially more current and for the first time the public will be able to have volume figures and stock indices on the OTC market.

Three Level System

The OTC bid and ask quotations will be entered into the central computers throughout each trading day by hundreds of market makers, designated Level

III subscribers, using special key-sets. The computers will record the entry of each quote on each issue by each market maker. A key-set user (broker/dealer firm) can retrieve a list of all market makers in that issue and the current bid and asked quote of each one of them.

Similar key-sets will be provided to hundreds of retail trading firms executing orders for the public. These firms, Level II subscribers, will be able to interrogate the computer but will not be able to enter data into the system.

It is expected that the most widely used level of service, termed Level I, will supply a representative quote to approximately 30,000 desk-top units now in use in the sales departments of brokerage offices to obtain listed prices. The use of a representative quote on a particular issue will insure the reliability of the price information received by investors and prevent erroneous quotes. A representative quote is the median of all



Anthony A. Barnett, Bunker-Ramo vice president, demonstrates a prototype terminal for the Nasdaq system for, left to right, Phil E. Pearce, NASD board chairman; E.L. Schmidt, Bunker-Ramo vice president and general manager; and Richard B. Walbert, NASD president.

actual market maker quotes in that stock entered through Level III equipment.

Bunker-Ramo will proceed with the design and construction of a new computer center to be located at Trumbull, Conn. and five other communication centers to be located in major cities and tied to the main computer center.

In addition to supplying quotes to those involved in trading, the Nasdaq system will furnish the NASD itself with summary reports of OTC activity and will supply end-of-day reports to newspapers and wire services.

A byproduct of the system will be an hourly updated OTC market index.

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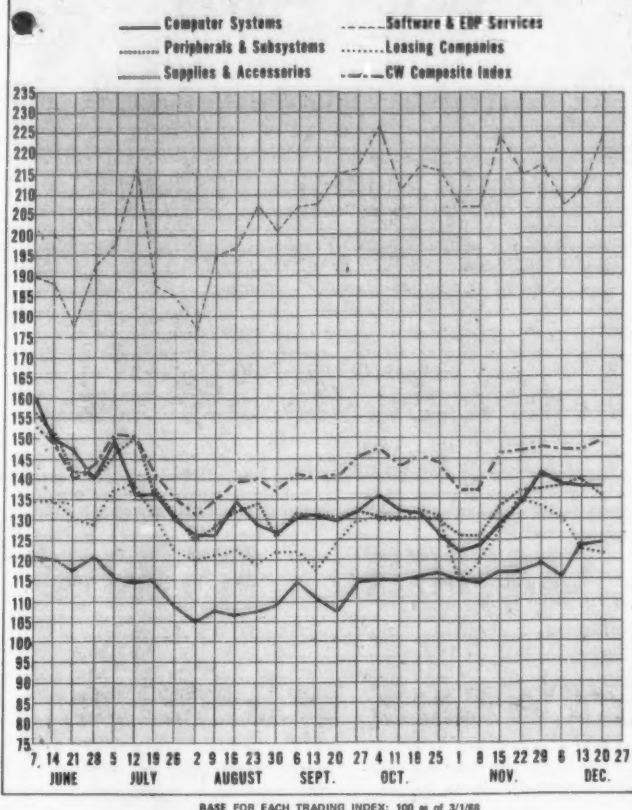
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Computer Stocks Trading Index



CW Index Gains As Dow Drops

The Computerworld composite stock index rose 2 points (1.36%) to 149 during the week ended Dec. 20. During the same period, which saw the Federal Reserve Board boost its discount rate, the Dow Jones industrial average fell 14 points (1.50%) to 967. The Dow lost 5 points on both Monday and Tuesday, regained 4 points Thursday after a 9 point loss that morning, and then suffered an 8 point loss Friday.

Generally, the major markets were down while the OTC stocks gained ground. The New York Stock Exchange composite index fell 0.66 (1.09%) to 60.30. Standard & Poor's industrial average was off 1.40 (1.20%) to 115.87. The American exchange price index rose 0.02 (0.06%) to 33.25, while the NYB OTC index gained 18.38 (4.44%) to 431.83.

Year End Rally

A year-end rally was still expected, however. Market historians note that during the past 16 years the market usually has risen on Christmas eve. Lucien Hooper of W.E. Hutton & Co. expects a rise to new highs before the end of January, followed by adverse market reaction — "as much as 10% in the Dow Jones industrial average" — to steps expected to be taken by credit authorities and the Nixon administration to tame inflation.

Software & Services

The rise in the CW index reflects an upward swing by several stocks in the Software & EDP Services sector — the only sector to show an increase. Four

of the seven Computerworld-listed stocks to show an increase of 10% or more are in the Software sector — up 13 points (6.16%) to 224. Aries rose 3-3/4 (23.80%); Datamation Services, 3-1/2 (15.55%); National Computer Analysts, 3 (15%); and Brandon Applied Systems, up 2 (12.12%). U.S. Time Sharing suffered a 4 point (17.02%) loss, largest among CW stocks. United Data Centers was off 1-1/2 (12.50%).

Peripherals & Subsystems

The Peripherals & Subsystems sector index suffered the largest loss, and was off 4 points (2.86%). Electronic Memories, up 13% in the previous week, fell 8 (11.94%). Digitronics was off 2-1/2 (10.87%). Bolt, Beranek & Newman's 3 point (17.39%) gain led the sector.

Both the Computer Systems sector and the Leasing sector lost ground. The former closed at 137, down 1, while the latter was off 1 to 122. The Leasing sector featured the largest gainer among CW stocks. DPA Inc. jumped 4 points (27.83%). Large losses were suffered by Lectro Computer Leasing, down 1-1/4 (16.67%); Cyber-Tronics, down 2 (15.67%); and Boothe Computer, down 6-1/2 (13%).

The Supplies & Accessories sector's index remained unchanged at 124. Baltimore Business Forms' 3 point (11.54%) gain was the only large one in the sector.

Overall, losers outnumbered gainers 62 to 35, with 8 stocks unchanged. This compares with 50 losers, 47 gainers, and 8 unchanged in the previous week.

COMPUTER STOCKS: TRADING SUMMARY

WEEK ENDED DECEMBER 20, 1968

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	COMPUTER SYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	163 3/8	253-157	238 3/4	Burroughs	-1	-0.42	+46.14
NYSE	67 3/4	110-54	74	Collins Radio	+1 3/4	+2.42	+9.22
NYSE	101 1/2	174-94	146 3/4	Control Data	-3 1/4	-2.20	+44.58
AMSE	102	177-95	174 1/4	Digital Equipment	-2 3/4	-1.55	+70.83
NYSE	19 1/8	27-18	23 1/8	Electronic Assoc.	-1 5/8	-6.57	+20.91
NYSE	87 1/4	100-81	95 5/8	General Electric	-7/8	-0.92	+9.60
NYSE	60	91-59	87 5/8	Hewlett-Packard	+3/4	+0.86	+46.04
NYSE	93 1/8	144-89	118 1/2	Honeywell			+27.25
NYSE	288 1/2	375-280	322	IBM	+5 1/2	+1.74	+11.61
NYSE	103 7/8	153-40	120 7/8	NCR	-5 5/8	-4.45	+16.36
NYSE	46 7/8	53-44	47	RCA	-1 1/4	-2.59	+0.27
NYSE	39 1/8	53-44	49 3/4	Raytheon	-1/8	-0.26	+27.16
OTC	22 1/2	66-20	43	Sci. Control Corp.	+1/2	+1.18	+91.11
NYSE	78 3/4	114-72	95 5/8	Scientific Data	-1 3/8	-1.68	+21.43
NYSE	45	63-42	48 1/8	Sperry Rand	-1 1/2	-3.03	+6.94
AMSE	22 1/2	39-20	30 1/4	Systems Eng. Labs	+1/8	+0.41	+34.44
EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	PERIPHERALS & SUBSYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	58 3/8	91-52	72 1/2	Addressograph-Multigraph	-3 3/8	-4.14	+24.20
OTC	21	85-42	75	Alphanumeric	+3	+4.17	+257.14
NYSE	29	41-26	38 3/8	Ampex	-3 1/2	-8.36	+32.33
OTC	17 1/4	27-14	20 1/4	Bolt, Beranek & Newman	+3	+17.39	+17.39
NYSE	13 1/2	27-14	17 3/8	Bunker-Ramo	+1/4	+1.46	+28.70
AMSE	32 1/8	50-27	36 5/8	CalComp	-1 3/4	-4.56	+14.01
OTC	24 1/2	49-20	37 1/4	Cognitronics	-1 3/4	-4.49	+52.04
OTC	12	18-10	16	Computer Equipment	-1/8	-0.78	+33.33
AMSE	15 1/4	23-13	23 3/4	Data Products	+2	+9.19	+55.74
OTC	19 1/4	27-16	20 1/2	Digitronics	-2 1/2	-10.87	+6.49
OTC	39	67-32	59	Electronic Memories	-8	-11.94	+51.28
OTC	10	29-9	14	Fabri-Tek	-1/8	-0.89	+40.00
OTC	20 5/8	65-16	36 1/2	Farrington Mfg.	-2 3/4	-7.01	+76.97
OTC	12 1/2	26-10	23 3/4	Information Displays	-2 1/2	-9.52	+90.00
AMSE	16 7/8	52-14	27 3/8	Milgo Electronics	-1 1/8	-3.95	+62.22
AMSE	57 1/2	108-54	70 1/2	Mohawk Data Sciences	-7/8	-1.23	+22.61
OTC	74	145-71	133	Optical Scanning Corp.	-3	-2.21	+79.72
OTC	18	42-16	31 1/2	Photon	-1/2	-1.57	+75.00
AMSE	25 5/8	38-12	30 1/4	Potter Instrument	+1/4	+0.83	+18.05
OTC	40 1/4	99-38	77	Recognition Equipment	-2	-2.53	+91.30
AMSE	16	29-14	22 5/8	Rixon Electronics	-3/8	-1.68	+41.41
NYSE	46 1/8	66-42	60 1/2	Sanders	+3/4	+1.25	+31.16
OTC	47	155-53	80	Scan-Data			+70.21
OTC	40 1/2	51-34	34	Tally Corp.	-1	-2.86	+16.05
NYSE	242 1/4	321-229	273 1/2	Xerox	+1/2	+0.18	+12.90
EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	SUPPLIES & ACCESSORIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	48 1/2	64-37	41 1/2	Acme Visible	-1/2	-1.20	+14.50
NYSE	20 1/2	32-18	20 1/4	Adams-Millis	-7/8	-4.14	+1.22
OTC	13 5/8	29-13	29	Baltimore Business Forms	+3	+11.54	+112.84
AMSE	27	44-21	27	Barry Wright	-2 5/8	-8.86	
OTC	31 1/4	40-26	35 1/2	Data Documents	-1	-2.74	+13.60
OTC	27 1/4	44-26	42	Ennis Business Forms	-1 1/2	-3.45	+54.13
NYSE	84 1/8	119-81	108 1/2	3M Company	+7/8	+0.81	+28.97
NYSE	58	93-48	87 1/4	Memorex	+3 5/8	+4.33	+50.43
OTC	27 1/4	32-25	32 1/8	Moore Business Forms	+1/8	+0.39	+17.89
NYSE	57 1/4	49-24	49 1/2	Nashua Corp.	+1 1/8	+2.32	+13.54
OTC	31 1/4	56-40	48 1/2	Reynolds & Reynolds	+1/2	+1.04	+55.20
OTC	34 1/2	35-24	29	Standard Register	-2 1/4	-7.20	+15.94
NYSE	37 3/4	44-30	33 1/4	Uarco	-1 3/8	-3.97	+11.92
AMSE	14 1/4	23-13	20 1/4	Wabash Magnetics	-2	-6.99	+42.10
OTC	25 3/4	37-24	30 3/4	Wallace Business Forms	-3/4	-2.38	+19.42
EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	SOFTWARE & EDP SERVICES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	7 1/2	25-7	13	Advanced Computer Techniques			+73.33
OTC	17	36-14	34	Applied Data Research			+100.00
OTC	15 1/2	23-13	19 1/2	Aries	+3 3/4	+23.80	+25.81
AMSE	47	75-42	74 1/4	Automatic Data Processing	+3/4	+1.02	+57.98
OTC	4	19-4	14 3/4	Automation Sciences	-1 1/2	-9.23	+268.75
OTC	4 1/2	23-3	18 1/2	Brandon Applied Systems	+2	+12.12	+311.11
AMSE	22 7/8	43-19	21 1/8	Computer Applications	-3/4	-3.43	+7.65
OTC	5	15-7	14 1/2	Computer Environments	-1/2	-3.34	+190.00
OTC	30	64-24	58	Computer Network			+93.33
NYSE	40	64-36	57 1/8	Computer Sciences	-3 7/8	-6.35	+42.81
OTC	39	62-28	44	Computer Usage	+1/2	+1.15	+12.82
AMSE	36 1/2	83-36	83	Computing & Software	+1	+1.22	+127.39
OTC	12 1/2	26-5	26	Datamation Services	+3 1/2	+15.55	+108.00
OTC	14 1/2	22-10	19 1/2	Datatab	-1/2	-2.50	+34.48
OTC	12 1/2	20-9	14	Digitek	+1/2	+3.70	+11.99
AMSE	38 3/8	52-26	31 1/4	Electronic Computer Prog. Inst.	-1 1/4	-3.85	+18.57
OTC	35	68-32	64	Informatics	-2	-3.09	+82.86
OTC	21	28-4	18	Matrix Corp.	-1 1/2	-7.69	+14.29
OTC	5	28-4	23	National Computer Analysts	+3	+15.00	+360.00
AMSE	31	61-28	60 7/8	Planning Research	+3/8	+0.61	+96.37
OTC	a13 1/4	a15-10	11	Programming & Systems	+1/2	+4.76	+16.99
OTC	9	15-8	9	Software Systems	-1/2	-5.26	
OTC	a29 1/2	a44-8	44	Strategic Systems	+1	+2.32	+49.15
OTC	20 1/2	22-10	11 1/2	TBS Computing Centers, Inc.	+1/2	+4.54	+460.97
OTC	a12	a12-10	10 1/2	United Data Centers	-1 1/2	-12.50	+12.50
OTC	63	182-57	170	University Computing	+2	+1.19	+169.84
OTC	a20	36-20	36 1/2	URS Systems Corp.	+1 1/2	+4.29	+82.50
OTC	a30	a30-19	19 1/2	U.S. Time-Sharing	-4	-17.02	+35.00
EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	LEASING COMPANIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	18	55-18	43 1/2	Boothe Computer	-6 1/2	-13.00	+141.67
OTC	4 1/4	24-4	14	Computer Exchange	-1	-6.67	+211.11
AMSE	25 1/8	36-21	23 1/2	Computer Leasing	-3/8	-1.57	+6.47
OTC	a15 3/8	15-9	15 1/4	Continental Computer			+0.81
OTC	12 1/4	19-11	10 3/4	Cyber-Tronics	-2	-15.69	+12.25
AMSE	106 5/8	92-44	63 7/8	Data Proc. Financial & General	-1	-1.54	+40.09
OTC	12 1/2	17-8	17 1/2	Datron Rental			+40.00
OTC	20	59-18	53	Dearborn Computer	-1 3/4	-3.20	+165.00
OTC	13 1/4	19-12	18 3/8	DPA, Inc.	+4	+27.83	+38.68
AMSE	28 3/4	43-25	27 3/4	Greyhound Computer	-1 3/4	-5.93	+3.48
AMSE	28 1/8	69-36	43 3/8	Granite Equipment Leasing	+3/8	+0.87	+54.22
AMSE	49	139-41	126 1/4	Leasco	-4 1/2	-3.44	+157.65
OTC	5	14-5	6 1/4	Lectro Computer Leasing	-1 1/4	-16.67	+25.00
AMSE	30 3/4	66-27	54 1/2	Levin-Townsend Computer Corp.	+7/8	+2.11	+77.23
OTC	10 1/2	16-8	7 1/2	LMC Data, Inc.	-3/4	-9.09	+28.57
OTC	10 7/8	16-10	13 3/4	Management Assistance	-3/4	-5.17	+26.44
AMSE	41 5/8	53-25	36 1/2	National Equipment Rental	+1	+2.82	+12.32
OTC	a13 1/4	14-8	9 5/8	NCC Leasing	-5/8	-6.10	+27.36
AMSE	38	64-35	40 3/4	Randolph Computer Corp.	-3/8	-0.91	+7.24
OTC	10 1/2	53-10	49	System Capital Corp.			+366.67
AMSE	10 7/8	25-10	23 5/8	U.S. Leasing	-1 1/4	-5.04	+117.24

a—Since 10/18/68 *Companies included in Computerworld's stock trading index for each sector.

CAI Project Goes to SDC

SANTA MONICA, Calif. — The Air Force Electronic Systems Div. has contracted with System Development Corp. to develop a computer based training program for the Phase II Base Level Data Automation System. The training system will provide on the job instruction for military users, operators, and managers. Lesson designers will construct material in a real-time, interactive mode at remote communications terminals tied to a Burroughs B3500 computer system. A trainee will have the option of selecting material to be viewed during the teaching session by lesson, subject, and purpose of the session. Text material and

CONTRACTS

questions are presented to the trainee at the remote terminal and his responses recorded and evaluated by the program.

Army Gives Work to CSC

LOS ANGELES — The Army Sentinel System Command, Huntsville, Ala., has awarded a \$723,000 contract to Computer Sciences Corp. to assist in the development of a computer based information system which will aid in the deployment of the Sentinel Ballistic Missile Defense

System. Work will be done at CSC's Huntsville Operations Center and at the Sentinel System Command headquarters. CSC will perform the operational design of the information system, develop financial and technical information for users, and write the computer programs to make the system operational, using the Cogent system.

DDS Wins PMS Award

COLLEGE PARK, Md. — Photo Magnetic Systems, Inc. has awarded a \$100,000 contract to Delta Data Systems, Inc. to develop time sharing applications for credit checking, order entry, and general accounting.

POSITION ANNOUNCEMENTS

KEY DATA PROCESSING PERSONNEL

FOR AN EXPANDING NATIONAL ORGANIZATION

RESPONSIBLE AND AGGRESSIVE—PROFIT ORIENTED PERSONNEL NEEDED TO COMPLEMENT OUR ACTIVITIES IN:

- DATA PROCESSING CENTERS
- SOFTWARE DEVELOPMENT
- COMPUTER FACILITY MANAGEMENT
- PACKAGE SOFTWARE MARKETING

ORIGINATORS OF READYSYS III

SCS STERLING COMPUTER SYSTEMS, INC.

Write Dept. P-2, 3306 Montrose Boulevard, Houston, Texas 77006

COMPUTERWORLD "COMPUTERWARE" CLASSIFIED SECTIONS

For more information or to place an ad, call or write Computerworld Classified Department, 60 Austin St., Newton, Mass. 02160 (617) 332-5606

SOFTWARE FOR SALE

Purpose —

- To provide a low cost marketplace for general and specific purpose program package for the benefit of both buyer and seller.

Rate Information —

- Rates per column inch 1-13/16" wide:
 - 1 Col. inch 14.00 per week
 - 2 Col. inches 28.00 per week
 - 3 Col. inches 35.00 per week
 - 4 Col. inches 42.00 per week
 - 5 Col. inches 49.00 per week
 - 6 Col. inches 56.00 per week
 - 7 Col. inches 63.00 per week

Minimum order 13 weeks (prepaid); less than 13 weeks rate is \$14.00 per column inch; maximum ad size 7 column inches; sold only in even inches (no fractions).

Format —

- Headline
- Description of package use and configuration.
- Price: (Optional)
- Contact information
- No special borders, no reverses
- Logos allowed

SOFTWARE WANTED

Purpose —

- To provide at low cost a place where a user or software house can make known to the computer community a general or specific software need.

Rate Information —

- Open rate \$18.20 per column inch (1-13/16" wide).
- Minimum size 1 inch.
- No maximum size.
- Minimum number of insertions — 1.
- Lineage discounts apply to large ads for long runs.

Format —

- Unspecified
- Borders allowed
- Headlines allowed
- Reverses allowed
- Logos allowed

TIME FOR SALE

Purpose —

- To provide at low cost a regionalized listing of available computer and machine time, time-sharing services, etc.

Rate Information —

- Rates per column inch 1-13/16" wide:
 - 1 Col. inch 14.00 per week
 - 2 Col. inches 28.00 per week
 - 3 Col. inches 25.00 per week
 - 4 Col. inches 30.00 per week

Minimum order 13 weeks (prepaid); less than 13 weeks rate is \$14.00 per column inch; maximum ad size 4 column inches; sold only in even inches (no fractions).

Format —

- Headline
- Information about system or service.
- Price: (Optional)
- Contact information
- No special borders, no reverses
- Logos allowed

BUY SELL SWAP

Purpose —

- To provide at low cost a general market place for equipment, systems, services, supplies and the like for the computer community.

Rate Information —

- Open rate \$18.20 per column inch (1-13/16" wide).
- Minimum size 1 inch
- No maximum size
- Minimum number of insertions — 1.
- Lineage discounts apply to large ads or long runs.

Format —

- Unspecified
- Borders allowed
- Headlines allowed
- Reverses allowed
- Logos allowed

Recruiting Requires Delicate Handling

By Sam Wilder

Vice President
Career Consultants, Inc.

Probably the most competitive personnel market in the country today is for engineers and EDP oriented people. The demand for qualified personnel in most professional disciplines seems insatiable, and the competition for those persons available is un-

precedented. There just are not enough persons with the required disciplines available, and, as a result, a situation has developed that, if it were not so serious, it would be ludicrous. Highly qualified people are playing a very profitable game of musical chairs, and this situation is extending through all echelons of professional disciplines.

While many plans have been

conceived by companies and professional recruiting firms to attempt to alleviate this situation, no one company as yet seems to have put together a complete program that has been organized, planned, and executed with sufficient aplomb to have any great overall effect on the market.

Knowing Where to Look

All individuals in the personnel recruiting field today are or should be cognizant of the geographical areas in which specific disciplines are most likely to be located. In many instances this type of operation has been carried on with the sophistication of a market research study, especially in those cases where highly specialized disciplines are required.

Knowing where to look, however, is of little value if a well planned, organized, and coordinated program has not been developed to effectively recruit the desired personnel. Every step of such a program from the method of establishing first contact to the proffering of the offer is of equal importance and has to be handled accordingly.

Many methods are available to contact applicants within any given geographical area, and they vary depending upon company, circumstances, and conscience. Regardless of methods, however, the problems of planning, coordinating, and communications are rather parallel.

Recruiting Out of Town

For example, if a company or recruiting firm has a recruiting team traveling on a national basis it is not just a problem of supporting this team in the field with local newspaper and trade journal advertising, direct mail, and the names of any potential applicants in the area. The problem lies in the method in which the prospective applicants recruited are processed and handled once the basic information is received by the home office.

Of course, one of the most efficient and effective methods is to have personnel traveling with the team who have the authority to make on the spot offers. The advantages of such an operation are obvious.

Timing Is Critical

If this method is not feasible, however, fast, efficient processing and distribution of resumes and decisions as to interest or no interest are of vital importance because time in this respect is no longer a commodity of the employer.

Once it has been determined that there is interest in a resume, the process of contacting, setting up a mutually convenient time for plant interviews, and arranging transportation and lodging should proceed per pre-arranged plan. Many potential applicants become disenchanted with companies because of slipshod handling of these basic arrangements. Above all, any person who is scheduled to talk to an applicant should be briefed on the individual's experience and background, and the position for which he is being considered.

As soon after the interview as possible, the applicant should be notified as to whether there is interest or not. To allow an applicant just to hang for two or three weeks after an interview is almost certain to cause him to lose interest in a company, and in speaking with friends and associates his comments can adversely affect the opinions of other potential applicants.

Follow-Up Is Important

Even though every aspect of the recruiting effort and the in-plant interview has been handled with dispatch, the overall effort cannot stop at this point, or again potential applicants will be lost.

Establishment of a firm timetable for a buy or no-buy decision once an applicant has been interviewed is essential, and the applicant should never leave an interview without being given a definite date by which he can expect to be notified, and this date must be kept.

If possible, prior to the interview, a general letter about the company with a brochure and, if feasible, information on the

local community, should be sent to the applicant. If time does not permit this prior to the interview, it certainly should be included in the letter acknowledging the interview.

Applicant Is the Buyer

Exceedingly well organized and planned programs as outlined will meet with varying degrees of success depending upon the forcefulness with which they are pursued. The one element that is overlooked in so many programs is the psychological approach or attitude of the individuals at every management level involved in the recruiting effort.

Anyone who has any contact with a prospective applicant should realize that today the applicant is the buyer and the company the seller. All too seldom are the full ramifications of this fact exhibited in dealing with applicants, and to achieve the maximum results desired, regardless of all other elements, any recruiting program has to be endowed with the seller's approach—above all, common courtesy and respect for individual dignity.

POSITION ANNOUNCEMENTS



Data Processing Professionals BRANCH MANAGERS' POSITIONS

Dynamic young organization is seeking experienced managers, sales or systems representatives to join Data Personnel Consultants in the rewarding field of EDP personnel placement services.

Professional managers, sales and systems representatives formerly with nationally recognized data processing companies staff our present offices.

Compensation is outstanding and profit participation and stock options are immediately available.

DPC, the placement firm for data processing personnel, is now expanding its operation in many major cities. For complete details contact:

DATA PERSONNEL CONSULTANTS

Joseph Falvey / 274 Weybosset Street / Providence, R. I. 02903 / (401) 274-7250
or any of our Branch Managers
Michael Rembjas / 274 Weybosset St. / Providence, R. I. 02903 / (401) 274-7250
Dan Rees / 60 Hickory Drive / Waltham, Massachusetts 02154 / (617) 893-0630
Paul Roland / 100 Constitution Plaza / Hartford, Conn. 06103 / (203) 522-8248
John Klar / 1815 N. Fort Myer Dr. / Arlington, Virginia 22209 / (703) 525-6350
Donald Wehrly / 111 East Avenue / Norwalk, Conn. 06851 / (203) 853-3880

COMPUTER OPPORTUNITIES

at PIPER AIRCRAFT CORPORATION

Expansion of our Data Processing Department has created several opportunities for:

SYSTEMS ANALYSTS
PROGRAMMERS — ALL LEVELS
OPERATIONS SUPERVISORS
EXPERIENCED OPERATORS

I.B.M. System 360 disc/tape experience extremely helpful. Competitive fringe benefits plus liberal flying privileges.

Contact: C. DAN HASBROUCK
PIPER AIRCRAFT CORPORATION
P.O. Box 1328
VERO BEACH, FLORIDA 32960
Phone: (305) 567-4361, ext. 221

PROGRAMMER

Leading foreign automobile distributor with record of phenomenal growth, located in pleasant suburban community only 20 minutes from George Washington Bridge. Looking for ambitious, personable, programmer interested in stimulating new projects, an opportunity for rapid advancement. About 5 years data processing experience desirable. Minimum of 2 years COBOL coding. 360 DOS experience. Modern new offices, excellent working conditions, fully paid benefits and other fringes. High starting salary. Send resume in confidence to CW Box 3011.

Software Development

Ground floor opportunities are available in a newly formed software subsidiary of a public corporation.

Stock options available to individuals with proven capabilities in more than one of the following:

- Engineering (Scientific Applications)
- Compilers
- Commercial Applications
- Real Time/Time Sharing Systems

Send resume in complete confidence
including salary requirements to
CW Box 3013

Acquisitions

Brandon Applied Systems Forms New Company

NEW YORK — Ennis Brandon Computer Services, Inc. — a new company formed by Brandon Applied Systems, Inc. and Ennis Business Forms, Inc. — has been incorporated with authorized capital of \$5 million initially — composed of five million shares of common stock of \$1 par value.

The new company will be headquartered in Dallas, according to Dick H. Brandon, president of Brandon Applied Systems, Inc.

Dearborn Acquires Muchowich Marine

CHICAGO — Dearborn Computer Corp. announced an expansion of its operations in the offshore oil industry through the signing of an agreement to acquire the Muchowich Marine Service, Inc., Freeport, Texas, for an undisclosed amount of Dearborn Computer stock.

The acquisition will be treated on a pooling of interest basis. According to Arthur Weiss, Dearborn president, Muchowich Marine will be operated as a wholly owned subsidiary.

Planning Research Acquires H.B. Maynard

NEW YORK — Planning Research Corp. announced that its shareholders had voted approval of the acquisition of H.B. Maynard & Co., a Pittsburgh based management consulting firm.

The merger agreement involves an initial payment by Planning Research of 245,000 shares of its common stock on a pre-split basis. Maynard can receive up to 245,000 additional shares, the number to be determined by its earnings over the next four years.

University Computing Acquires Hunter Assoc.

DALLAS — Hunter Associates, Inc., a consulting engineering firm, has merged with University Computing Co., according to a joint announcement by Homer A. Hunter, president of Hunter, and Sam Wyly, president of UCC.

Terms of the merger were not detailed but involved an exchange of University Computing stock for the privately held assets and business of Hunter.

Informatics to Buy 70% of Dataplan

SHERMAN OAKS, Calif. — The Interpublic Group of Companies and Informatics, Inc. have agreed in principle to the joint operation of Dataplan, Inc. as a supplier of computer services in the marketing communications field.

Informatics will purchase a 70% interest in Dataplan, an Interpublic Group subsidiary, for \$1,600,000 cash. Interpublic retains 30% ownership. Dataplan will continue to be operated in New York as a separate company.

According to Dr. Walter F. Bauer, Informatics' president, the transaction is subject to final agreement and approval by the boards of directors of both companies.

Louis Berger Inc. Acquired By Leasco in Stock Swap

GREAT NECK, N.Y. — Leasco Data Processing Equipment Corp. says it has acquired all the outstanding stock of Louis Berger Inc., East Orange, N.J., for \$7.5 million in Leasco common stock.

Berger is a privately owned firm that performs engineering, planning, and architectural services.



Visual Communications Terminal at the Manned Spacecraft Center in Houston displays mission data in real-time.

Computers Form Lifeline For Apollo 8 Moon Shot

(Continued from Page 1)

The Manned Spacecraft Center in Houston has a computer complex which processes the information for display on flight controller consoles. The entire process, from spacecraft to console, takes less than 10 seconds.

The central navigation computer on Apollo is a Univac 1230. It receives data on the vessel's attitude, velocity, and position and computes estimates for navigation and for tracking the spacecraft with shipboard radar systems.

GE Eliminates President's Position

NEW YORK — General Electric no longer has a president — and it doesn't intend to elect one.

Fred J. Borch, formerly president and chief executive officer, has been made chairman and chief executive officer. Borch, together with three new vice chairmen, will constitute the "corporate executive office."

The new vice chairmen and executive officers, all formerly executive vice presidents, are William H. Dennler, Jack S. Parker, and Herman L. Weiss.

The change made by the board of directors Dec. 20 was the second reorganization in less than a year. Last Jan. 1 the "president's office" was created. "Though the position of vice

chairman is not new to General Electric," Borch said, "there is no precedent for vice chairmen who are, in addition, executive officers of the company."

"Our own experience and the research of others support the need for innovative structuring beyond the traditional concept of the chairman and president positions."

60% Deceived by Computer

BOSTON — Students couldn't tell whether they were talking to a computer or a man at an experiment conducted at Massachusetts General Hospital.

The teletypewriters used by the students were connected to

Computers Need Watching Noted Columnist Tells Public

Special to Computerworld

NEW YORK — Commentator Edward P. Morgan, in a syndicated column datelined from the Fall Joint Computer Conference, told his readers that "whatever their function, computers are going to have to be watched."

Morgan came to his conclusion after getting an unusually "inside" view of the problems and possibilities of computers as he worked with industry leaders and experts on both a television discussion and a public presentation of the social impact of computers. Observers were impressed by his interest in the presentation of the arguments by such people as Dr. Alan Westin, Dr. Emanuel Mesthene, and Dr. Robert Hofstadter, and felt that his opinions could well be important for future decisions on how the computer profession would be regarded by the public at large.

Luddites Recalled

In his column, Morgan starts off by comparing the operation of computers with the Luddite rebellion in England at the beginning of the industrial revolution. He points to the rough parallels which some observers draw between the current violent assaults on our social and political institutions and the wrecking of factory machinery by the Luddites in the last century. He then comments about the reprisals by the propertied ruling classes which he describes as "grim and ghastly" and brings the matter up to date by pointing to the activities of the student militants who are assaulting the educational establishments and to the protests that "life is devoid of human values" made by both blacks and whites who blame this on the power structure of American society.

Machine Villain

At this point he introduces the computer for the first time as

"another machine villain." He points out that to many it represents a dehumanizing threat more serious than the steam engines and mechanized looms. He states further that it is a growing threat because data processing can be expected to match or surpass the motor car industry in size by 1975.

Warnings Brought Out

Talking about the panel discussions, he mentions the warnings of Dr. Westin ("Computers had already invaded personal pri-

vacy"), Dr. Mesthene ("Congress had failed to exercise proper responsibility over J. Edgar Hoover"), and Dr. Mesthene's comment that an idea of Dr. Hofstadter for a committee experiment in "instant democracy" would be dangerous and impractical. He concludes with the final comment that "whatever their function, computers are going to have to be watched."

Morgan's column appears in about 100 newspapers across the country.

Software Patent Appeal Raises '1984' Questions

(Continued from Page 1)

pointed out that the court originally had planned to have a rehearing and reargument (presumably before the death of Judge Smith) and now asks for it on the grounds of having overlooked the limited nature of congressional power under the Constitution.

Change in Position

In at least one respect, however, the Patent Office gives some comfort to the proponents of patenting. It now acknowledges that there is some doubt as to whether mental processes can be patented and points out that the Supreme Court has yet to pass on the question. Previously the Patent Office opinion had been that the principle that mental processes could not be patented was "well established" and did not need to be considered. Observers also expect that the lack of a Supreme Court ruling will be used by the Patent Office to bring the whole matter to the Supreme Court's attention if it loses the Prater & Wei case before the Court of Patent Appeals.

Thought Control

The question of thought control is introduced in the brief as a result of a statement in the original decision, which reads, "We find nothing to indicate an intent of Congress or the courts to deny patent protection to process claims merely because they could alternatively be... performed through the mind by the use of aids such as pencil and paper." Commenting on this, after a gibe at the phrase "patent protection" (which it calls "a favorite euphemism of the patent bar"), the brief says that this means that the court finds nothing "wrong or illegal or improper in authorizing the grant of a patent containing process claims of such breadth as to confer upon a patentee the right to exclude others from thinking in a certain manner."

1984 Threat

From this step — computer programs as such take a position backstage while the brief suddenly waves the flag of freedom — "If freedom of secular thought should not be considered within the safeguard of

the First Amendment, for lack of outward expression, it is nevertheless reserved to the people by the Ninth and Tenth Amendments. Indeed, reliance on a Bill of Rights should not be necessary here (Alexander Hamilton, *Federalist Papers*, No. 84). A free people could not have delegated to Congress any power to control personal thought, directly or otherwise. Orwell's 1984 was not to be our destiny, although such might come to pass if the judiciary is not vigilant."

Public Interest Involved

The brief points out that broad process claims might now be granted conferring the right to exclude people from thinking in a certain manner and says, "Public interest demands that this question should be more fully argued, and that the only way to do so now is by rehearing."

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the Project Mac computers at MIT. (Of the 24 students who participated in the experiment, 60% thought they were conversing with a man. The remaining 40% were unable to decide who or what they were talking with.)

One girl, who had decided early in the proceedings that she was conversing with a graduate student, accidentally fractured her arm by banging on the terminal when she became frustrated at the "wrong answers she received from the 'graduate student'."

Another girl became a little puzzled when the computer typed "CTSS not in operation." "CTSS must be his initials, he must be going for a coffee break," the girl thought. The girl waited patiently until the system went back into operation. "He's finished his coffee and is back," she told the researcher.

The experiment was reported in the *MGH News*, the hospital's newspaper.